# ANNUAL REPORT

OF THE

# CITY ENGINEER

OF

# TORONTO

FOR

## 1895

3888
21/8/96.

TORONTO
THE CARSWELL CO. (LIMITED), CITY PRINTERS, 22 ADELAIDE STREET EAST.
1896.

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# INDEX TO REPORTS.

## Works Department Matters.


| | PAGE. |
|---|---|
| Ashbridge's Bay | 3 |
| Accountant's Statement (App. "A") | 97 |
| Official Staff | 1 |
| Bridges | 7 |
| Financial | 2 |
| King Street Pavement | 8 |
| New Stables | 8 |
| Pavement Construction, cost of (table) | 6 |
| Roadways and Sidewalks | 4 |
| Rosedale Ravine Drive | 5 |
| Road Roller (steam) | 8 |
| Sewers | 3 |
| Street Railway Work | 4 |
| Scavengering | 8 |
| Street Cleaning | 8 |
| Street Watering | 9 |
| Wooden Sidewalks | 7 |
| Sewer Engineer's Report | 10 |
| Sewers built by day labor | 10 |
| " " contract | 10 |
| Sewer repairs | 10 |
| Charcoal ventilators | 11 |
| Rosedale Ravine sewer extension | 11 |
| Leslie Street sewer extension into deep water | 11 |
| Morse Street sewer extension into deep water | 11 |
| Dufferin Street sewer extension into deep water | 11 |
| Cement tests table | 12 |
| Plumbing inspection, etc | 13 |
| Roadway Engineer's Report | 14 |
| Table of different classes of work constructed | 14 |
| Table of mileage of different classes of pavement laid from 1890 to 1895 | 15 |
| Table of different classes of roadways and mileage of same from 1891 to 1895 | 16 |
| Table showing percentages of different classes of pavement in City | 17 |
| Brick pavements | 17 |
| Table of brick tests | 18 |
| Bench marks | 24 |
| Street Railway pavements | 25 |
| Asphalt pavements | 26 |
| Table of pavements and concrete walks laid during year | 26 |
| Table of asphalt pavements upon which guarantees have expired or are about to expire | 28 |
| Asphalt pavement repairs | 28 |
| Table of analysis of asphalt | 30 |
| Asphaltina | 30 |
| Trinidad asphalt analysis | 31 |
| Concrete sidewalks | 33 |
| Census of travel on streets | 33 |
| Table of records of travel on Adelaide Street | 34 |
| Wooden block roadways | 35 |
| " " table of | 37 |
| Intersections | 40 |
| Broken stone roadways | 41 |
| Queen's Park Drive | 43 |
| Bridge Engineer's Report | 44 |
| Gerrard Street bridge | 44 |
| Glen Road bridge | 44 |
| Huntley Street bridge | 45 |
| Sherbourne Street bridge | 45 |
| Winchester Street bridge | 45 |
| Eastern Avenue bridge | 46 |
| Crawford Street bridge | 46 |

| | PAGE. |
|---|---|
| Shaw Street bridge | 46 |
| Humber River bridge | 46 |
| Strachan Avenue bridge | 47 |
| Island Park bridge | 47 |
| Queen Street subway | 47 |
| Cattle Market bridge | 47 |
| City Surveyor's Report | 49 |
| Tax sales | 49 |
| Rosedale Valley Road | 49 |
| Island | 50 |
| Berkeley Street level crossing | 50 |
| Dundas Street bridges arbitration | 50 |
| Street naming | 51 |
| Don Improvement | 51 |
| City plan | 51 |
| Street Commissioner's Report | 52 |
| Sidewalks | 52 |
| Lake Shore Road sidewalk | 53 |
| Church Street sidewalk | 54 |
| Sidewalk extensions | 54 |
| Roadway repairs | 55 |
| King Street pavement | 55 |
| St. Patrick Street brick pavement | 56 |
| Queen's Park Drive | 56 |
| Bay and Lake Street roadway | 56 |
| Danforth Avenue roadway | 57 |
| Reconstructing | 57 |
| Stone and wood crossings and kerbing | 57 |
| New stables | 58 |
| Scavengering | 58 |
| Street cleaning | 59 |
| Snow cleaning | 60 |
| Street watering | 61 |
| Distribution of water to householders | 61 |
| Street opening permits | 62 |
| Culverts and gullies | 63 |
| Prince's Walk | 63 |
| Pound fees | 63 |
| Complaints | 63 |
| Table of wood walks laid during year | 64 |


## Water Works Matters.


| | |
|---|---|
| Accident to conduit | 68 |
| Coa consumption | 73 |
| Distribution | 67 |
| Financial | 67 |
| Five-foot screen, tank and connections | 74 |
| Hydrants | 68 |
| Mansergh's Report | 71 |
| Main Pumping Station | 72 |
| Meter and Machine Shops | 74 |
| Rosehill Reservoir | 73 |
| Removal of mains | 74 |
| Six-foot wooden conduit | 72 |
| Supply | 72 |
| Summary of Statistics | 75 |
| Work necessitated by lowness of lake | 69 |
| Report of Assistant Engineer on Water Works construction | 79 |
| Distribution | 79 |
| Services | 79 |
| Hydrants | 80 |
| Main Pumping Station | 80 |
| High Level Pumping Station | 80 |
| Rosehill Reservoir and Park | 81 |
| Stables | 81 |
| Removal of mains | 81 |
| Thirty-inch connection on Front Street | 82 |
| Anchoring conduit | 83 |
| Mechanical Engineer's Report | 85 |
| Five-foot pipe, screen, tank and connections | 85 |
| New cast iron lining to well in Engine House | 85 |
| New steel pipe to replace 6-ft. wood | 85 |
| Meter and Machine Shop | 85 |
| Valve and Hydrant Shop | 86 |
| Repairs to broken conduits | 87 |
| Pumping sand from 6-ft. wooden pipe | 88 |
| Shore crib | 89 |

PAGE.

Report of Chief Engineer of Main Pumping Station ..... 90
Report of Engineer in charge of High Level Pumping Station..... 95

Water Works Schedules, Appendix "B":

Schedule No. 1, cash expenditure on maintenance, construction and renewal accounts..122, 123, 124
Schedule No. 2, statement of water pumped by Engines Nos. 1, 2 and 3..... 124
Schedule No. 3, statement of water pumped by Engines Nos. 4 and 5 124
Schedule No. 4, record of water repumped at High Level Station. 124
Schedule No. 5, record of gauging at Rosehill Reservoir for each month..... 125
Schedule No. 6, comparative statement showing number of gallons pumped, quantity and cost of fuel, etc., from 1876 to 1895.... 126
Schedule No. 7, quantity of water pumped and consumed during each month of 1895, with amount of daily consumption..... 127

PAGE

Schedule No. 8, comparative statement showing increase of Department yearly, 1875 to 1895 inclusive ..... 128
Schedule No. 9, comparative statement of coal consumed and water pumped by months during 1894 and 1895..... 128
Schedule No. 10, analysis of expenditure at Main Pumping Station, 1895..... 129
Schedule 11, mains taken up or abandoned during 1895, also summary of mains now in use.. 130
Schedule No. 12, hydrants placed in position and removed off streets during 1895, also number in use at end of 1895..... 132
Schedule No. 13, list of all valves placed in position and taken out during 1895, showing the size position, etc., also total number now in use..... 134
Schedule No. 14, statement of house services laid in 1895..... 136
Statement of meters changed..... 140
" " in use at end 1895 141

# INDEX TO PLANS.

## Works.


| | PAGE. | | PAGE. |
|---|---|---|---|
| Cement test diagrams (5) | 12 | Pick-up sweeper and iron cart (photo) | 54 |
| Diagram showing travel on Adelaide Street | 32 | Sweeper (photo) | 56 |
| Island Park bridge | 46 | Western stable (photo) | 58 |
| | | Trolley sprinkler (photo) | 60 |


## Water Works.


| | | | |
|---|---|---|---|
| Profile of conduit | 68 | Mains, etc., at Pumping Station | 74 |

# TORONTO

★★★★★

THE City of Toronto is situated upon the northern shore of Lake Ontario, about 40 miles easterly of its western terminus. It lies in latitude 49° 39′ 10″ north, longitude 79° 23′ west, on a plateau gently ascending north for a distance of three miles, where an altitude of about 220 feet above the Lake level is reached. It extends about eight miles along the Lake, and is generally level, with slight depressions at points where minor water courses formerly existed. The River Don flows through the eastern part of the City, and the River Humber immediately to the west of its western limit. The harbor is formed in front of the City by a sandy island that lies to the south, at a distance of about a mile and a half.

The area within the City limits, not including the Island or portions of City land covered by water, is 10,391 acres, or 16.2 square miles.

In this area there is a population of 188,914 (Police census of City, 1891).

There are 256.40 miles of streets, of which, including broken stone roadways, 176.9 miles are paved and 79.5 miles unpaved.

82¼ miles of lanes.

228.17 miles of sewers.

430 miles of sidewalks.

248.33 miles of water mains.

225 miles of gas mains.

120 miles of underground electric conduit.

4,288 miles of overhead electric wire.

80 miles of steam railway track.

85.22 miles of street railway track.

The estimated value of property owned by the City is over $8,400,000.

Total assessment of property in the City, $140,995,981.

Property in City exempt from taxation, value, $23,313,578.

Value of buildings erected during 1895, $1,346,810.

# ANNUAL REPORT

OF THE

# CITY ENGINEER

## TORONTO

## FOR THE YEAR 1895.

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CITY ENGINEER'S OFFICE,
Toronto, December 31st, 1895.

*To His Worship the Mayor and Members of the Council of the Corporation of the City of Toronto :*

GENTLEMEN,—In compliance with By-law No. 2534, I have the honor to lay before you my Annual Report for the year ending 31st December, 1895, setting forth the various works of construction and maintenance, together with details of cost.

### OFFICIAL STAFF.

The following is a list of the chief officers who composed the official staff during the past year in the Works and Water Works Departments :

| | |
|---|---|
| City Engineer and Chief Engineer of Water Works Dept. | Edward H. Keating, M. Inst. C.E., M. Am. Soc. C.E. |
| Deputy City Engineer | Charles H. Rust, M. Can. Soc. C.E. |
| Asst. Engineer on Sewers and Water Works Construction | C. L. Fellowes, C.E. |
| Asst. Engineer on Roadways | H. D. Ellis, D.L.S., O.L.S., Assoc. M. Can. Soc. C.E. |
| Asst Engineer on Bridges and Mech. Eng'r, Water Works Dept | John Williams, M. Can. Soc. C.E. |
| Surveyor | Villiers Sankey, O.L.S. |
| Street Commissioner | John Jones. |
| Asst. " | W. Evans. |
| Accountant | Wm. McCartney. |
| Chief Clerk Works Dept. | E. P. Roden. |

Secretary Committee on Works .....A. H. Clarke.
Secretary City Engineer ..... .....G. J. Castle.
Clerk, Plumbing Department.....C. E. Rudge.
Chief Engineer, Main Pumping Station .Robert Pink, M.E.
Chief Engineer, High Level Pumping Station..... .....Charles Heal, M.E.
Clerk, Water Works Dept. (Engineering Branch).....Chas. A. Matthews.
Foreman of Construction, Water Works Dept..... .....Edward Foley.
Foreman in Charge Machine Shop, Water Works Dept ..... .....H. J. Orpen.
Foreman in Charge Hydrants, Water Works Dept .....Wm. Black.
Storekeeper, Water Works Dept.....Thos. Skippon.

## WATER WORKS.

For Water Works matters see separate report.

## WORKS DEPARTMENT.

### FINANCIAL.

During the year the total expenditure of the Works Department (not including Water Works) was $637,131.66, which was divided as follows:

| | |
|---|---|
| General appropriation..... ..... ..... | $315,744 46 |
| Special works ..... .. ..... ..... | 90,240 69 |
| Street Railway pavements.... ..... | 41,727 48 |
| Local Improvements..... ..... | 143,381 87 |
| Personal and Departmental account ... ..... | 46,007 26 |
| Total..... ..... | $637,131 76 |

The amount for Local Improvements was divided as follows:

| | |
|---|---|
| Pavements ..... ..... ..... | $94,480 97 |
| Sewers ..... ..... ..... ..... | 8,201 80 |
| Sidewalks, stone, cement, etc. ..... | 14,891 51 |
| Sidewalks, wooden ..... ..... | 22,078 34 |
| Bridges, extensions and street openings... ..... | 3,729 25 |
| Total..... | $143,381 87 |

As against $219,178.62 expended in the previous year on similar local improvement works, or a falling off of $75,796.75 for the year, of which $63,615.64 occurred in the item of pavements.

As it is advisable that plank sidewalks should gradually be abolished in the centre of the City, I recommend that the area for improved permanent sidewalks be again extended.

## ASHBRIDGE'S BAY.

Section No. 1, which was the only contract remaining uncompleted at the close of the previous year, was practically finished on the 27th July, 1895. Under the terms of the contract, however, the contractor has to maintain the channel and works for a period of twelve months from that date.

## SEWERS.

During the year 2,301 lineal feet of new sewers were constructed, of which 1,379 lineal feet were built by day labor. The total length of sewers of all kinds in the City is now 228.17 miles. 107.06 miles of sewers have been flushed and cleaned during the year, at a cost of $4,919.51, or at the rate of $45.72 per mile.

The only important sewer construction work done this year was the extension of the Rosedale Ravine sewer, from Avenue Road to Bedford Road, and the outlet of this sewer at the Don was reconstructed.

Owing to the low state of the water in the Lake and to the nuisance caused to the residents in the vicinity of the Exhibition Grounds, it was necessary to extend Dufferin Street and Fort Rouille Street sewers into deeper water.

During the year 283 private drains, representing 1.68 miles, were constructed from the main sewer to the property line, the amount received for this work being $6,457.88.

In the Plumbing Department the number of inspections made during the year was 10,767, as against 8,000 made in 1894.

## STREET RAILWAY WORK.

The principal street railway work done during the past year was the laying of permanent pavements on the track allowance on the extensions of the tracks on Ossington Avenue, Avenue Road, Simcoe, York and Station Streets.

The class of pavement used between these rails was brick, granite and Trinidad asphalt. The latter material has not proved satisfactory for paving between the rails, and its further use for that purpose should be discontinued.

## ROADWAYS AND SIDEWALKS.

The length of new pavements laid during the year was 5.81 miles and 1.91 miles of improved sidewalks. The work was divided as follows:

| | |
|---|---|
| Asphalt | 1.156 miles. |
| Cedar block on gravel | 1.753 " |
| Macadam | 1.663 " |
| Cedar block on concrete (track allowance) | .227 " |
| Stone setts on concrete (track allowance) | .085 " |
| Scoria blocks on concrete (track allowance) | .117 " |
| Brick on concrete | .744 " |
| Brick on gravel | .003 " |
| Concrete pavements in lanes | .071 " |
| Total | 5.819 " |
| Improved sidewalks | 1.918 " |

The total length of streets in the City is 256.40 miles, made up as follows:

| | |
|---|---|
| Cedar block | 109.78 miles. |
| Stone and scoria | 0.81 " |
| Asphalt | 14.38 " |
| Wood on concrete | 0.49 " |
| Macadam | 39.15 " |
| Unpaved | 79.48 " |
| Cedar with asphalt on track allowance | 6.35 " |
| Macadam with stone setts on tracks | 0.73 " |
| Brick on concrete | 0.38 " |
| Cedar with brick on tracks | 4.85 " |
| Total | 256.40 " |

Although paving brick has been used during the past two years to a considerable extent as a wearing surface on the track allowances, it has for the first time been tried as a pavement for the whole width

of a street, during the past year this material having been used exclusively in repaving Amelia and Selby Streets. The paving bricks employed on Amelia Street were imported from Ohio, while those used on Selby Street are of local manufacture, and so far appear to be quite equal in every respect to the best imported bricks. Further time is, however, required before any positive conclusions can be arrived at as to the relative value of the two classes of brick.

A short section of St. Patrick Street, 158 feet in length, in front of the Ryerson School, has been paved with brick, on a gravel foundation, as an experiment. If this should prove satisfactory, this class of pavement might be advantageously adopted on streets where the traffic is light, in place of cedar blocks, which are yearly falling into greater disrepute. Brick pavements of this description could be laid down, under ordinary circumstances, for about $1.25 per square yard, as compared with $1.80 for a similar pavement on concrete. Further information on this subject will be found in the report of the Assistant Engineer on Roadways.

There are now over five miles of asphalt roadways no longer under guarantee by the contractors, and it will be necessary for the City to take steps towards keeping these in repair.

## ROSEDALE RAVINE DRIVE.

A commencement was made in the construction of this Drive. Some grading was done and a picket fence constructed from the Don to Yonge Street.

## COST OF PAVEMENT CONSTRUCTION.

For the information of the ratepayers, I give below a table showing the comparative cost of different classes of pavement, based on the past year's prices. The table also shows the annual cost to the ratepayers per lineal foot of frontage and other particulars, which are frequently asked for :

TABLE SHOWING COST OF DIFFERENT CLASSES OF PAVEMENT 24 FEET WIDE, WITH WOODEN AND STONE KERBS.

| Description of Pavement. | Cost per Square Yard. | Cost of Kerbing per lineal foot. | | Cost of Pavement per lineal foot frontage. | | Number of Annual Payments. | Cost per foot Frontage per Annum. | Cost per ft. front'ge per annum for each additional foot in width. |
|---|---|---|---|---|---|---|---|---|
| | | Stone. 4-inch. | Wood. 4-inch. | With stone kerbs. | With Wooden kerbs. | | | |
| | | | | | | | Cents. | Cents. |
| Heavy asphalt (6-in. concrete, 2½-in. asphalt) | $2 40 | $0 80 | ..... | $4 40 | ..... | 10 | 54 | 1.8 |
| Light asphalt (4-in. concrete, 2-in. asphalt) | 2 00 | 0 80 | ..... | 3 80 | ..... | 10 | 47 | 1.5 |
| Vitrified brick on 4 inches concrete | 1 65 | 0 80 | ..... | 3 30 | ..... | 10 | 41 | 1.2 |
| " " on brick laid flat | 1 50 | 0 80 | ..... | 3 08 | ..... | 6 | 59 | 1.7 |
| " " on broken stone | 1 45 | 0 80 | ..... | 3 00 | ..... | 6 | 57 | 1.7 |
| " " on gravel | 1 25 | 0 80 | ..... | 2 72 | ..... | 6 | 52 | 1.5 |
| " " on brick laid flat | 1 50 | ..... | 0 15 | ..... | $2 36 | 6 | 45 | 1.7 |
| " " on broken stone | 1 45 | ..... | 0 15 | ..... | 2 29 | 6 | 44 | 1.7 |
| " " on gravel | 1 25 | ..... | 0 15 | ..... | 2 00 | 6 | 38 | 1.5 |
| Cedar block on 6 inches concrete | 1 40 | 0 80 | ..... | 2 94 | ..... | 8 | 44 | 1.3 |
| " " on 6 inches gravel (wooden kerb) | 0 70 | ..... | 0 15 | ..... | 1 19 | 5 | 27 | 1.0 |
| " " on 6 inches concrete " | 1 40 | ..... | 0 15 | ..... | 2 22 | 8 | 33 | 1.3 |
| " " relaid (wooden kerb) | 0 55 | ..... | 0 15 | ..... | 0 97 | 5 | 22 | 0.8 |
| Macadam (stone kerb) | 1 20 | 0 80 | ..... | 2 65 | ..... | 5 | 60 | 1.5 |
| " (wooden kerb) | 1 20 | ..... | 0 15 | ..... | 1 90 | 5 | 43 | 1.5 |

## BRIDGES.

During the year the usual repairs have been made to the different bridges, and five of them have been repainted.

A new steel and iron bridge has been constructed, under the supervision of this Department, across the Long Pond at the Island Park. This bridge consists of three arch spans, the centre one being sixty feet in the clear and the two others thirty feet, with a roadway twenty-two feet in width between parapets. The piers and abutments are of stone masonry, the contract for which was awarded to Mr. A. J. Brown, at $2,949, and the contract for the superstructure to the Central Bridge Company, of Peterboro, at $3,660. The total cost of the bridge, complete, was $6,762.70.

Owing to a fire at the Cattle Market, the wooden ramps forming the approaches to the bridge were destroyed, and the south span supports were very much injured, the floor girders being so distorted that they had to be rebuilt. A full description of the work and repairs done to the bridge will be found in the attached report of the Assistant Engineer on bridge work.

## WOODEN SIDEWALKS.

During the year the mileage of wooden sidewalks laid was 14.80, as against 18.03 for the previous year. This decreased mileage is owing partly to the opposition on the part of the property owners to burden themselves with any more local improvement taxes than can possibly be avoided, and also to the strong effort made by the Department to repair, as far as possible, the present sidewalks in place of recommending new ones. It is perhaps proper that I should call the attention of the Council to a danger that exists in this connection. The property owners are of course anxious, in order to avoid special taxation, to have their sidewalks repaired at the general City cost for as great a length of time as possible, the consequence being that sufficient consideration is not always given to the fact that the City is liable for damages for accidents that may occur owing to defects in the walks, which it is difficult to avoid or to remedy immediately on their discovery in constructions of this kind, where the mileage is so great as it is in this City.

The quantity of lumber used in the construction of these walks during the year was 1,219,307 ft., B.M., and 29,175 lbs. of nails were used.

The old wooden sidewalk on the west side of Church Street, from Gould to Gerrard, was replaced by a brick sidewalk composed of a common stock brick. A few paving bricks were also laid for the purpose of ascertaining their relative wearing qualities. The average cost of construction was 89 cents per square yard.

ROADWAYS.

KING STREET PAVEMENT.—On the western approach to the King Street subway the tamarac blocks, which were laid in 1890, had become so much out of repair that it was necessary to repave the roadway. In doing this work a good opportunity presented itself of testing the wearing qualities of different kinds of wood, of which the following descriptions were used, viz.: Beech, maple, rock elm, soft elm, hemlock, white pine and Norway pine. The blocks were rectangular, measuring 4 in. x 7 in. on the face by 6 in. deep.

During the year an appropriation of $4,000 was made for putting some of the roadways in the Queen's Park in a better state of repair. The money has been partly expended on the west crescent and on the roadway running south towards Queen Street, but the work is not yet completed.

ROAD ROLLER.—During the year a 12½-ton Aveling & Porter steam road roller was purchased at a cost of $3,033.10, which has proved of great advantage to the Department in constructing and reconstructing macadam roads.

NEW STABLES.—Owing to the dilapidated condition of the old stables in the west end of the City, it was necessary that some steps should be taken towards erecting a new structure. The Council appropriated the sum of $4,000 for this purpose, and brick stables were erected on the Corporation lot on the north side of King Street, immediately west of the subway. There is accommodation for sixty horses in these stables.

SCAVENGERING.—During the year 113,924 loads of refuse were collected, of which 34,588 loads were garbage. 2,359 dead cats and 781 dead dogs were taken to the crematories.

STREET CLEANING.—The total expenditure during the year on this service was $56,078.66, which covers, in addition to street cleaning (including asphalt pavements, which are cleaned on the patrol system), the removal of snow and ice from the street intersections,

railway tracks, bridges, etc. Before the actual work of street cleaning proper commenced nearly $20,000 was spent in the removal of snow from the streets, with an additional $7,000 in cleaning snow from sidewalks fronting on vacant houses and lots. Altogether the Department cleaned 16,036 miles of streets, removing 49,286 loads of scrapings, sweepings, etc. In connection with snow cleaning, the past winter was an exceptional one both in the severity of the frost and the depth of snow. Notwithstanding these facts the rate for cleaning sidewalks fronting on vacant property was slightly lower than last year.

The aggregate length of sidewalks cleaned of snow was a little over 346 miles, being 50 miles in excess of the previous winter.

Street Watering.—In connection with this work, the most important matter to record is the second season's operation of the watering of the street railway tracks by the trolley system. During the past year the Company had 3 tanks on electric cars, the average number of miles covered was 14,189. The total amount of water used by these tanks during the year was 18,766,300 imp. gallons, while the quantity used by watering carts and waggons was 41,823,500 imp. gallons. Owing to the accident to the water works conduit, the street watering was entirely discontinued from September 7th to October 21st, and during that time, the supply of pure water being cut off, all the street watering carts and street railway tanks were utilized to distribute pure water to the householders, which was procured from the municipalities of East Toronto, North Toronto and West Toronto Junction. In addition to our own plant, the City of Hamilton kindly loaned the Department twelve large watering carts. During this period 4,857,150 imp. gallons were distributed by this means to the public for drinking purposes. The carts made three trips through the streets daily, and the daily distribution averaged about $\frac{1}{2}$ a gallon per head of the population.

Respectfully submitted,

E. H. KEATING,
*City Engineer.*

# REPORT OF ASSISTANT ENGINEER IN CHARGE OF SEWERS.

SEWER DEPARTMENT,
Toronto, December 31st, 1895.

E. H. KEATING, ESQ.,
*City Engineer.*

DEAR SIR,—I beg to submit herewith the Annual Report of the work done under the supervision of this branch of the Works Department during the year 1895, as follows:

During the year 0.43 miles of sewers were constructed (particulars in schedule herewith), of which 0.26 miles were built by day labor. The following is a detailed statement of the various works:

SEWERS BUILT BY DAY LABOR.

| | | |
|---|---|---|
| 12-in. tile pipe sewer | 816 | lin. ft. |
| 2-ft. circular brick | 105 | " |
| 4 ft. x 2 ft. 8 in | 120 | " |
| 4-ft. x 4-ft. box drain | 168 | " |
| 2-ft. x 2-ft. " | 170 | " |
| | 1,379 | " |

SEWERS BUILT BY CONTRACT.

| | | |
|---|---|---|
| 6-ft. 6-in. circular brick sewer | 922 | lin. ft. |

In connection with the construction of these sewers, 4 manholes, 3 manhole culverts and 9 gullies were built.

The following work has been done during the year by the foremen on sewer repairs:

| | |
|---|---|
| New manholes built | 136 |
| Manholes repaired | 10 |
| Gullies built | 181 |
| Gullies repaired | 17 |

Miles of sewers flushed and cleaned, 107.6, at a cost of $4,919.51, or $45.72 per mile.

The following is a list of the plans made during the year:

| | |
|---|---|
| Contract plans, sewers | 1 |
| Plans for day labor work | 10 |
| Working plans | 20 |
| Miscellaneous plans | 170 |

There are at present fifty-nine flush tanks in the City, eleven of which were built this year; all are in working order.

During the year thirty-nine dead ends have been connected, and four charcoal ventilators built to improve the sanitary condition of the City.

The Rosedale Ravine sewer has been extended along Pears Avenue from Avenue Road to Bedford Road, and the outlet of this sewer at the Don reconstructed.

Leslie Street and Morse Street sewers have been extended 170 feet to the line of the new channel through Ashbridge's Bay.

The Dufferin Street sewer outlet has been extended 120 feet to deeper water. The extension has been solidly built of stone collected on the adjoining shore of the Lake.

A great deal of time and labor has been expended in working up information and data for the City Solicitor in defence of the claim of Dineen v. Toronto, on account of the flooding of their cellar on the 19th of June, 1892. As there were suits amounting to $30,000 or $40,000 of a similar nature depending on the result of this suit, no exertion was spared to win it, which the City fortunately did.

## CEMENT.

The diagrams hereto attached show the result of the tests of the different brands of cement used in the various City works during the year.

## SEWERS BUILT BY DAY LABOR.

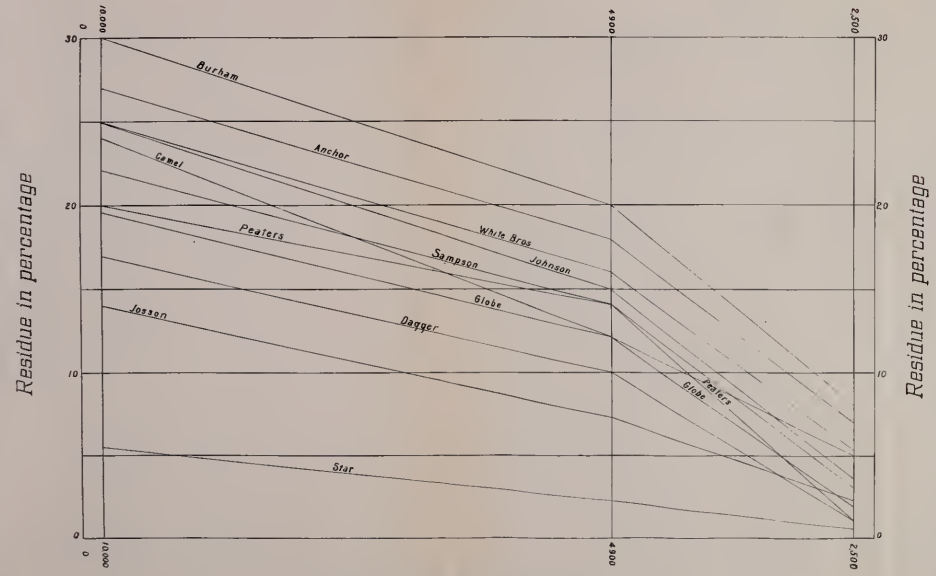
| Street. | From | To | Size. | Description. | Length in feet. | Manholes. | Gullies. | P. D. Connections. | Average Depth. | Nature of Soil. | Total Cost. | Cost per lineal foot. | Foreman. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | $ c. | $ c. | |
| Lane | Peter | West | 12-in. | Tile pipe | 300 | 2 | .. | 10 | 11 ft. | Clay | 330 79 | 1 10 | A. McCormack. |
| Lane | Allan Ave | North | 12-in. | " | 80 | 1 | .. | 2 | 10 ft. 6 in | Sandy | 102 30 | 1 28 | Wm. Hill. |
| Station | Simcoe | East | 12-in. | " | 436 | 2 | 8 | 1 | 6 ft. | Clay | 518 80 | 1 19 | A. McCormack. |
| Dufferin | Extension of | outlet | 4 ft. x 2 ft. 8 in | Stone | 120 | .. | .. | .. | .... | ..... | 740 00 | 6 16 | George Carrette. |
| Severn | Yonge | Skynner's lot | 2 ft. | Circu'r brick | 105 | 1 | .. | .. | 10 ft. | Clay | 376 00 | 3 58 | George Hill. |
| Leslie | Extension of | outlet | 4 ft. x 4 ft. | Box drain | 168 | .. | .. | .. | .... | ..... | 387 00 | 2 18 | George Carrette. |
| Morse | " | " | 2 ft. x 2 ft. | " | 170 | .. | .. | .. | .... | .... | 355 00 | 2 08 | George Carrette. |

## SEWERS BUILT BY CONTRACT.

| Street. | From | To | Size. | Description. | Length in feet. | Manholes. | Gullies. | P. D. Connections | Average Depth. | Nature of Soil. | Total Cost. | Cost per lineal foot. | Inspector. | Contractor. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | ft. in. | | $ c. | $ c. | | |
| Pears Ave. | Avenue Rd. | Bedford Rd. | 6 ft. 6 in. | Circu'r brick | 922 | 2 | 2 | 41 | 10 6 | Hard clay | 7,052 22 | 7 65 | Geo. Carrette. | Smith & Wilson. |

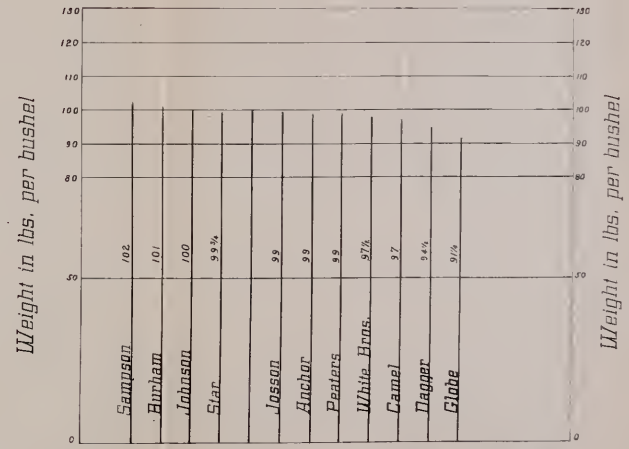
# SIFTING DIAGRAM

Number of Meshes in sieve per sq. inch



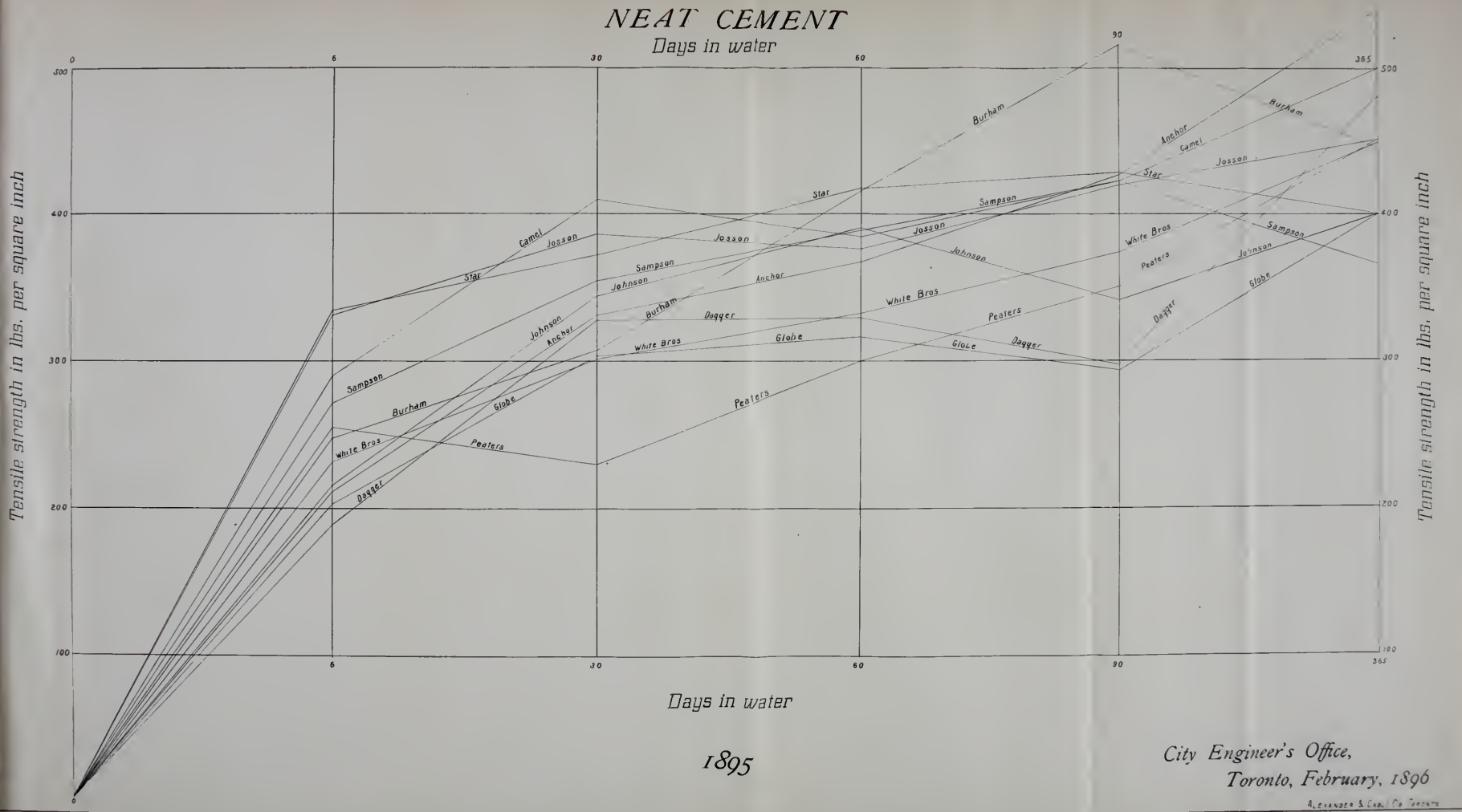

1895

# WEIGHT DIAGRAM




*City Engineer's Office,*
*Toronto, January, 1896*

ALEXANDER & CABLE CO. TORONTO

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*Toronto, February, 1896*

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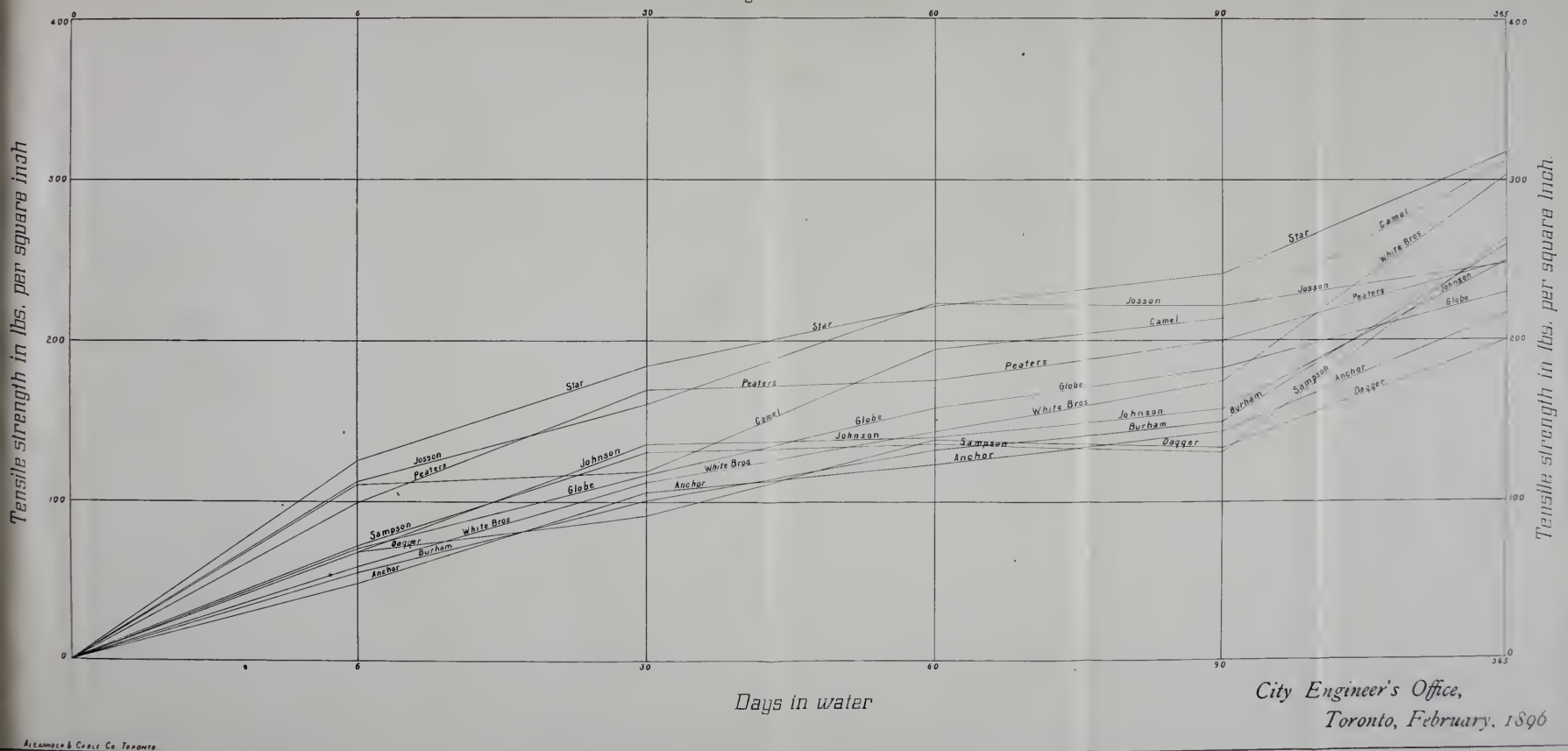
# CEMENT MORTAR— 3 to 1




*City Engineer's Office,*
*Toronto, February, 1896*

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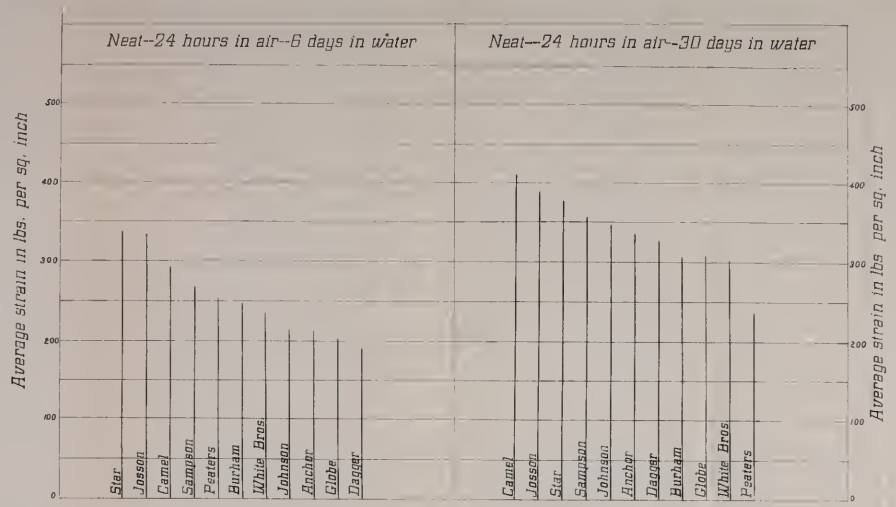
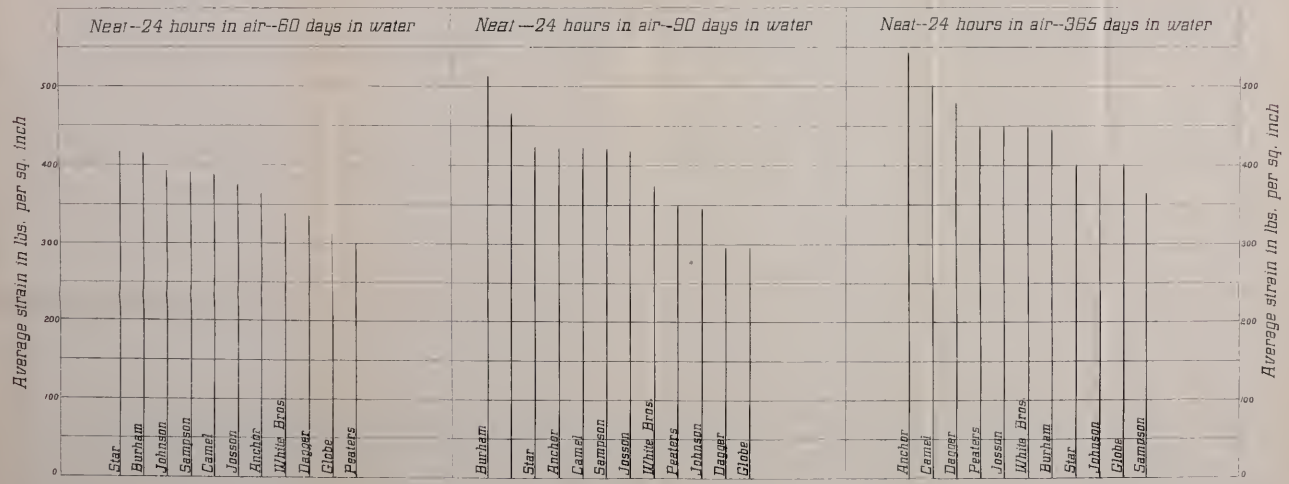
1895

# DIAGRAM shewing the TENSILE STRENGTH of VARIOUS BRANDS of CEMENT




E. H. Keating.
City Engr.

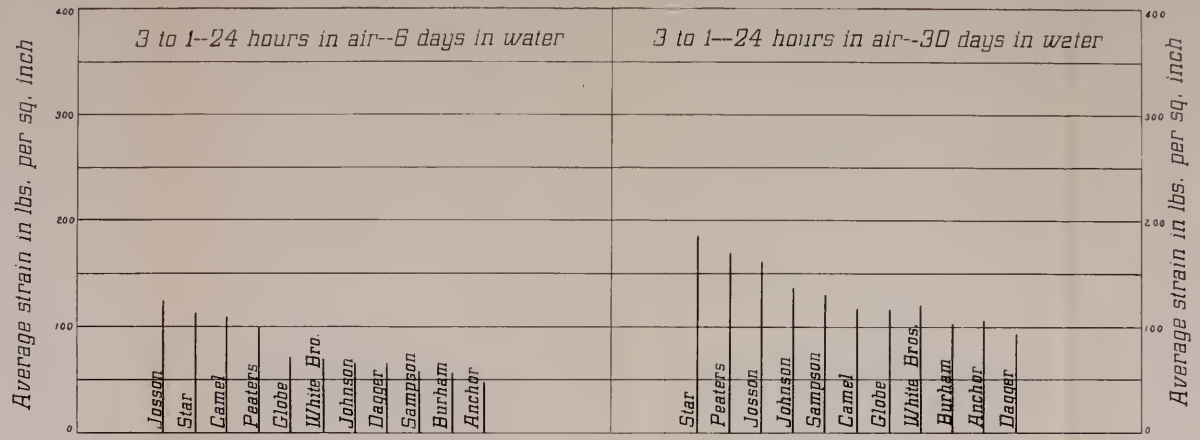



City Engineer's Office
Toronto, Feb.-96.

Alexander & Cable Co. Toronto

1895

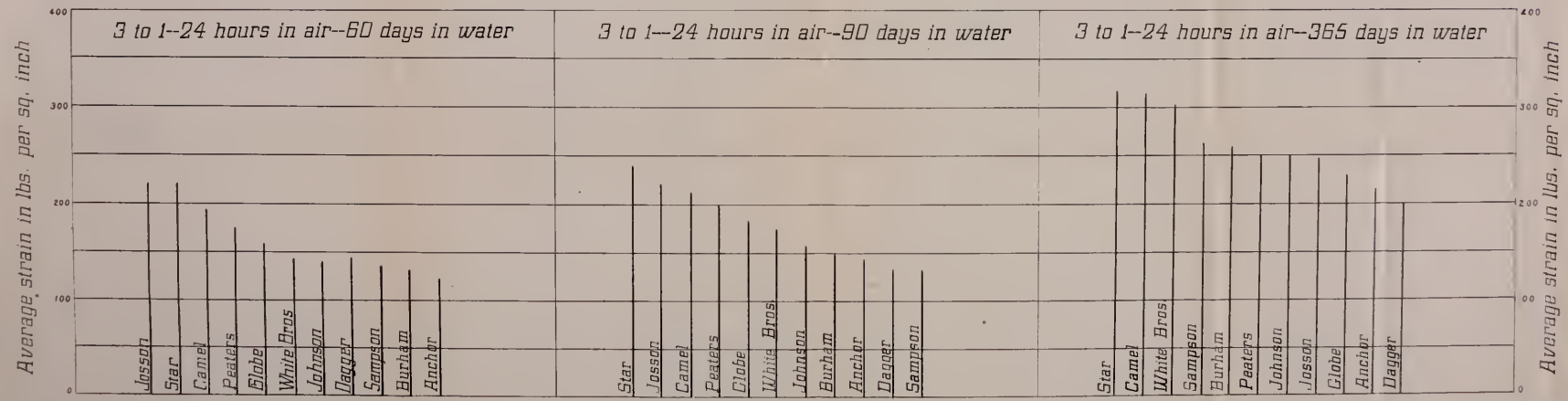
# DIAGRAM shewing the TENSILE STRENGTH of VARIOUS BRANDS of CEMENT







E. H. Keating.
City Engr.










City Engineer's Office
Toronto, Feb-95

Alexander & Cable Co Toronto

## PLUMBING BRANCH.

The following schedule shows the work of this branch of the Department:

*Permits.*

| | |
|---|---|
| Plumbing and drainage | 370 |
| Plumbing only | 190 |
| Drainage only | 138 |
| | 698 |

*Number of Buildings Represented in Permits Issued.*

| | |
|---|---|
| Plumbing and drainage | 509 |
| Plumbing only | 207 |
| Drains only | 188 |
| | 904 |

*Notices of Inspection Filed.*

| | |
|---|---|
| Plumbing | 1,711 |
| Drainage | 881 |
| | 2,592 |

*Number of Inspections Made.*

| | |
|---|---|
| Plumbing and drainage | 10,767 |
| Smoke tests | 622 |
| | 11,389 |

*Number of Yards of Private Drains Laid.*

| | | |
|---|---|---|
| 6-in. drains | 2,590⅔ | yards. |
| 9-in. " | 362 | " |
| 12-in. " | 11 | " |
| | 2,963⅔ | " |

There were 55 repair orders attended to.

Yours truly,

C. L. FELLOWES,
*Assist. Engineer in charge of Sewers.*

## REPORT OF

# ASSISTANT ENGINEER IN CHARGE OF ROADWAYS.

ROADWAY DEPARTMENT,
Toronto, December 31st, 1895.

E. H. KEATING, ESQ., C.E.,
*City Engineer, Toronto.*

DEAR SIR,—In compliance with your instructions I have prepared the following report of the various works carried out under the supervision of this branch of the Works Department during the year 1895:

During the past year there were constructed 5.816 miles of new pavement and 1.918 miles of permanent sidewalk. In carrying out the above works there were 32 contracts made and 2 works performed by day labor. In addition to the contracts and work already referred to, there were 8 pieces of work performed by private contract, and the Street Commissioner's Department carried out 3 pieces by day labor, making in all 45 different pieces of work which required the supervision of this Department, and which are shown in their various classes in the following table:

TABLE No. 1.

| *Class of Pavement.* | *No. of Works.* |
|---|---|
| Asphalt pavements on concrete | 5 |
| Stone sett scoria pavements on concrete | 1 |
| Brick pavements on concrete | 3 |
| Cedar and granite pavements on concrete | 1 |
| Cedar block pavements on sand | 7 |
| Concrete pavements | 3 |
| Macadam | 6 |
| Private contracts | 8 |
| Concrete sidewalks | 11 |
| Total | 45 |

In addition to the above there were prepared 118 plans and 325 estimates.

TABLE No. 2.

MILEAGE OF DIFFERENT CLASSES OF PAVEMENTS AND SIDEWALKS LAID FROM 1890 TO 1895.

*Pavements.*

| Class of Pavement. | 1890. | 1891. | 1892. | 1893. | 1894. | 1895. |
|---|---|---|---|---|---|---|
| | Miles. | Miles. | Miles. | Miles. | Miles. | Miles. |
| Asphalt | 1.73 | 1.635 | 6.216 | 5.607 | 3.067 | 1.156 |
| Cedar block on sand and plank foundation | 15.51 | 9.186 | 3.349 | 3.349 | 0.852 | 1.753 |
| Macadam | ..... | 0.123 | 0.494 | ..... | 0.059 | 1.663 |
| Cobble | 0.10 | 0.069 | 0.366 | ..... | ..... | ..... |
| Tamarac on concrete | 0.192 | 0.077 | .... | ..... | ..... | ..... |
| Cedar block on concrete | ..... | ..... | 8.416 | 2.185 | 0.826 | 0.227 |
| Stone setts on concrete | ..... | ..... | 0.705 | 3.743 | 2.563 | 0.085 |
| Scoria block on concrete | 0.138 | ..... | 0.028 | ..... | ..... | 0.117 |
| Brick on concrete | ..... | ..... | ..... | 3.964 | 0.787 | 0.744 |
| Concrete pavements in lanes | ..... | ..... | ..... | ..... | ..... | 0.071 |
| Total of pavements | 17.670 | 11.090 | 19.574 | 18.748 | 8.154 | 5.816 |
| *Sidewalks.* | | | | | | |
| Concrete | 1.426 | 1.930 | 1.508 | 2.259 | 1.137 | 1.918 |
| Stone flag | 1.273 | 0.398 | 0.104 | .035 | .011 | ..... |
| Total of sidewalks | 2.699 | 2.328 | 1.612 | 2.294 | 1.148 | 1.918 |

The following table shows the changes which have taken place in the various pavements from 1881, when the first block pavement was laid, to the present time:

## TABLE No. 3.

Showing the Different Classes of Roadways and Mileage of Same from 1881 to 1895.

| Year. | Cedar Block. | Stone and Scoria. | Asphalt. | Wood on Concrete. | Macadam. | Unpaved. | Cedar with Asphalt on track allow'ce. | Cedar block with brick on track allowance. | Macadam with stone setts on track allowance. | Brick on Concrete. | Total Mileage. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Miles. | Miles. | Miles. | Miles. | Miles. | Miles. | Miles. | Miles. | Miles. | Miles. | Miles. |
| 1881 | 3.51 | 0.03 | ..... | ..... | 50 92 | 62.39 | ..... | ..... | ..... | ..... | 116.85 |
| 1882 | 13.41 | 0.03 | ..... | ..... | 48.28 | 55.13 | ..... | ..... | ..... | ..... | 116.85 |
| 1883 | 26.90 | 0.03 | ..... | ..... | 51.57 | 54.07 | ..... | ..... | ..... | ..... | 135.57 |
| 1884 | 33.76 | 0.25 | ..... | ..... | 52.32 | 76.77 | ..... | ..... | ..... | ..... | 163.10 |
| 1885 | 39.84 | 0 25 | ..... | ..... | 50.17 | 75.98 | ..... | ..... | ..... | ..... | 166.24 |
| 1886 | 48.99 | 0.36 | ..... | ..... | 47.36 | 72.18 | ..... | ..... | ..... | ..... | 168.89 |
| 1887 | 64.11 | 0.36 | 0.07 | ..... | 45.14 | 59.21 | ..... | ..... | ..... | ..... | 168.89 |
| 1888 | 79.55 | 0.36 | 0.25 | ..... | 42.76 | 49.87 | ..... | ..... | ..... | ..... | 172.79 |
| 1889 | 92.39 | 0.36 | 3.36 | ..... | 58.65 | 107.43 | ..... | ..... | ..... | ..... | 242.19 |
| 1890 | 109.57 | 0.36 | 5.08 | ..... | 36.63 | 90.55 | ..... | ..... | ..... | ..... | 242.19 |
| 1891 | 116.83 | 0.59 | 6.66 | 0.49 | 36.39 | 89.44 | ..... | ..... | ..... | ..... | 250.40 |
| 1892 | 116.86 | 0.65 | 10.49 | 0.49 | 36.98 | 84.89 | 2.35 | ..... | ..... | ..... | 252.71 |
| 1893 | 112.19 | 0.79 | 11.28 | 0.49 | 34.98 | 82.05 | 7.06 | 3.97 | 0.54 | ..... | 253.35 |
| 1894 | 111.16 | 0.81 | 13.70 | 0.49 | 35.95 | 79.98 | 6.35 | 4.50 | 0.54 | ..... | 253.48 |
| 1895 | 109.78 | 0.81 | 14 38 | 0.49 | 39.15 | 79.48 | 6.35 | 4.85 | 0.73 | 0.38 | 256.40 |

TABLE No. 4.

Showing Percentages of Different Classes of Pavement in City.

| | | |
|---|---|---|
| Cedar block | 42.82 | per cent. |
| Stone and scoria | .32 | " |
| Asphalt | 5.61 | " |
| Wood on concrete | .19 | " |
| Macadam | 15.24 | " |
| Unpaved | 31. | " |
| Cedar block with asphalt between tracks | 2.48 | " |
| Cedar block with brick between tracks | 1.90 | " |
| Macadam with stone setts between tracks | .29 | " |
| Brick on concrete | .15 | " |
| | 100. | " |

Total..... 256.40 miles.

## BRICK PAVEMENTS.

Two pavements of brick laid on a concrete foundation were constructed during the past season, viz.: Selby Street and Amelia Street. On both these roadways a concrete foundation 4 inches thick was first laid, and from $\frac{1}{2}$ inch to $\frac{3}{4}$ inch of sand placed between the bricks and the concrete to act as a cushion, and to take up any irregularities in the bricks or inequalities in the concrete surface. The joints were grouted with Portland cement mortar, mixed in the proportion of two of sand to one of cement. On Amelia Street, owing to various delays, the season was so far advanced when the final grouting was performed that the material got frozen, and the roadway should be carefully gone over in the Spring and any voids that may appear filled up with fresh material. The paving bricks used on Amelia Street were imported from the United States, and were manufactured by the Standard Shale Brick Exchange, of Canton, Ohio. They were very fair samples of that Company's manufacture, and by reference to the brick test table it will be seen that they made an excellent showing in the abrasion test. Selby Street was paved with bricks supplied by the Ontario Paving Brick Company, which were manufactured near Toronto Junction. These are bevelled, re-pressed bricks, and are the first home-made bricks used in the City. The Company manufacturing these bricks has put in an extensive, modern plant and has a very complete set of works for their manufacture. The machinery, dry kiln, kilns for burning and arrangements

for handling are of the latest and most approved design. Their machinery has a working capacity of 50,000 bricks per day, but their dry kilns cannot handle more than about 30,000 per day. I understand, however, that the Company is now building an addition to the dryer and putting in two extra kilns. The clay used is a mixture of the red Medina Shale from Campberville and a yellow clay found near the works. The following is an analysis of the Carlton clays used and the Campberville Shales:

| | 1 % Carlton. | 3 % Campberville. |
|---|---|---|
| Silica | 67.11 | 53.41 |
| Alumina | 15.88 | 5.32 |
| Ferric Oxide | 4.43 | 16.81 |
| Lime | 1.01 | 5.62 |
| Magnesia | 1.46 | 1.02 |
| Carbon Dioxide | ..... | 4.43 |

The brick manufactured by this Company is a tough, re-grained brick, almost impervious to water, and has come out well in the test for abrasion. Their method of manufacture is briefly as follows: A mixture is made of the Carlton clay and Campberville Shale in certain proportions, and then placed in a dry pan, where it is ground by revolving rollers and sifted until about the consistency of flour. This material is then elevated in small metal buckets attached to a belt and thrown upon a fine screen, which returns any material too coarse to pass the screen to the dry pan. The sifted mixture goes into a hopper and thence to the pug-mill, where a spray of water moistens it. The machine is of the auger type, and the clay is handled in a condition known as "stiff mud." It is delivered from the mouth of the machine in a continuous stream on to an endless belt, and cut automatically into the proper lengths by wires. The bricks thus cut are placed by hand in a steam repress, any defective bricks being then rejected. After repressing, the bricks are placed on cars, about 600 on each car, and wheeled into the dryer, where they are left 24 hours. This drying is an important part of the process and is done by means of artificial heat. After they are dried, the cars are wheeled into the kiln and the bricks set up for burning. The kiln used is a Eudaly down-draft kiln, in which a light fire is first started in order to water smoke the brick. When it is seen by the color of the smoke arising from the kiln that the water held in the clay has passed off, the heat is gradually increased until the bricks are brought almost to the point of fusion. Should the heat become too great at

# TABLE NO. 5. BRICK TESTS.

| No. of Specimen. | Size. | Specific Gravity. | Abrasions. Original Weight. | Weight after 2,000 Revolutions. | Weight after 4,000 Revolutions | Percentage of Loss by Weight after 2,000 Revolutions. | Percentage of Loss by Weight after 4,000 Revolutions. | Absorption. Loss in cub. inches per sq. in. of surface after 4,000 Revolutions. | Weight before Immersion. | Weight after Immersion. | Per cent of Increase by Weight. | Length of Time Immersed. | Source of Brick. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | inches. | | lbs. oz. | lbs. oz. | lbs. oz. | | | | | | | days. | | |
| 46 | $8\frac{1}{4}x5\frac{1}{4}x2\frac{1}{2}$ | 1.93 | 8 11.5 | 8 9.5 | 8 8 | 1.43 | 2.53 | .0180 | 86.78 gmm. | 88.290 | 1.74 | 3 | Pyrogranite | |
| 47 | 8x5x3 | 2.21 | 8 $7\frac{1}{2}$ | 8 3 | 7 $14\frac{1}{2}$ | 3.30 | 6.60 | .0501 | 8 lb. $7\frac{1}{2}$ oz. / 10 1 | 8 lbs. $10\frac{1}{2}$ oz. / 10.6 | 2.21 / 1.22 | 3 | Massillon Shale and Fire Brick Co | Bevelled edges. |
| 48 | $8\frac{1}{4}x4\frac{1}{4}x2\frac{1}{2}$ | 2.21 | 20 13 | 18 12 | 17 12 | 9 80 | 14.57 | .0965 | 6.12 | 6.14½ | 2.3 | 3 | " " " " | 3 bricks. |
| 49 | $8\frac{1}{4}x4\frac{1}{2}$ | ..... | 6 8 | 4 $14\frac{1}{2}$ | 4 9 | 24.5 | 30.0 | .192 | 6.8 | 6.8 | ..... | 3 | Dr. Farwell, Bronte | Dark brick. |
| 49a | $8\frac{1}{4}x4\frac{1}{2}$ | ..... | 6 13 | 6 1 | 5 11 | 11.0 | 16.5 | .1055 | 6.13 | 7.2 | 4.85 | 3 | " " | Light red brick. |
| 50 | ..... | 2.42 | 6 14 | 6 9 | ..... | 4.0 | ..... | ..... | 76.474 | 76.860 | 0.50 | 3 | J. H. New, 30 Colborne St | Hamilton brick. |
| 51 | $8\frac{1}{4}x4\frac{1}{2}$ | ..... | 5 $12\frac{1}{2}$ / 5 12 | 5 $4\frac{1}{2}$ / 5 5 | 5 $2\frac{1}{2}$ / 4 14 | 8.7 / 7.6 | 10.8 / 15.2 | .0838 av'rge of two. | $5.12\frac{1}{2}$ / 5.12 | $5.15\frac{1}{2}$ / 5.14 | 3.24 / 2.17 | 3 / 3 | Don Valley P. B. Co | |
| | | | lbs. | lbs. | lbs. | | | | | | | | | |
| 52 | ..... | ..... | 18.12 | 13.53 | ..... | 25.50 | ..... | ..... | ..... | ..... | ..... | ..... | Toronto Paving Brick Co | 3 bricks. |
| 53 | $8\frac{1}{4}x4x2\frac{1}{2}$ | 2.25 | 19 | ..... | 14.56 | ..... | 23.4 | 0.1518 | 5.47 | 5.50 | 0.54 | 3 | Burlington P. B. Co | 3 bricks. |
| 54 | $8\frac{1}{4}x4\frac{1}{2}$ | 2.12 | 19.31 | 15.87 | 15.50 | 17.60 | 19.7 | 0.1260 | 4.81 | 4.94 | 2.70 | 3 | " " | Repressed. |
| 55 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 5.37 | 5.34 | 18.00 | 3 | Don Valley P. B. Co | White. |
| | | | | | | | | | 5.56 | 5.62 | 1.08 | 3 | " " | Red. |
| 56 | $7\frac{1}{2}x3\frac{3}{4}x2\frac{3}{4}$ | ..... | 19.31 | 16.31 | 15.20 | 15.5 | 21.2 | 0.139 | ..... | ..... | ..... | ..... | Burlington P. B. Co | |
| 57 | (a) $8\frac{1}{4}x4x2\frac{1}{2}$ | 2.29 | 14.44 | 13.40 | 13 09 | 7.2 | 9.35 | 0.0603 | | | | | | (a) Common brick; 2 bricks marked B. |
| | (b) $8\frac{1}{4}x4x2\frac{1}{2}$ | | 7.45 | 6.97 | 6.50 | 6.4 | 12.70 | 0.0824 | 7.09 | 7.22 | 1.83 | 3 | Canton Shale | (b) Repressed. |
| | (c) 9x4x3 | ..... | 9.44 | 8.84 | 8.65 | 6.35 | 8.37 | 0.0602 | | | | | | (c) Block similar to (a) in appearance. |
| 58 | $9\frac{1}{4}x4x3$ | 2 21 | 25.70 | 23 37 | 22.5 | 9.07 | 12.50 | .0866 | 7.20 | 7.31 | 1.54 | 3 | Massillon Shale and Fire Brick Co | |
| 59 | $8\frac{3}{4}x4\frac{1}{2}x2\frac{3}{4}$ | 2.22 | 20.44 | 16.5 | 15.37 | 19 26 | 24.77 | 0.1626 | 5.31 | 5.44 | 2 45 | 3 | " " " " | |
| 60 | $8\frac{3}{4}x4\frac{1}{2}x2\frac{1}{2}$ | ..... | 20.62 | 17.75 | 16.68 | 13 94 | 19.09 | 0.1248 | 5.68 | 5.81 | 2.30 | 3 | Standard Massillon | |
| 61 | $8\frac{3}{4}x4\frac{1}{2}x2\frac{1}{2}$ | ..... | 21.68 | 18.25 | 17.23 | 11.23 | 20 52 | 0.1342 | 5.87 | 6.00 | 2.21 | 3 | Standard Canton | |
| 62 | $8\frac{3}{4}x4\frac{1}{2}x2\frac{1}{2}$ | ..... | 14.75 | 13.06 | 11.97 | 11.44 | 18.85 | 0.1230 | 6 15 | 6.37 | 3.57 | 3 | Paver Canton | |
| 63 | $8\frac{3}{4}x4\frac{1}{2}x2\frac{1}{2}$ | ..... | 7.37 | 6.56 | 6.23 | 11.02 | 15.68 | 0.1030 | 6.22 | 6.37 | 2.41 | 3 | Holloway Canton | |
| 64 | $8\frac{3}{4}x4x2\frac{1}{2}$ | 2 30 | 28.37 | 26.41 | 26.03 | 6.08 | 8.26 | 0.0544 | 6.68 | 6.68 | None | 3 | Franklin Shale, Penn. | |
| 65 | 9x4x3 | ..... | 19.06 | 17.94 | 17.06 | 5.90 | 10.50 | 0 0756 | 8.34 | 8.44 | 1.10 | 3 | Harris Paver | |
| 66 | 9x4x3 | ..... | 9.71 | 8.97 | 8.65 | 7.70 | 10.90 | 0.0784 | 8.65 | 8.71 | 0.80 | 3 | Harris Holwood | |
| 67 | $8x3\frac{3}{4}x2$ | 2.47 | 16.00 | 14 96 | 14.71 | 6.50 | 8.06 | 0.0451 | 71.438 gmm | 71.99 gmm | 0.76 | 3 | Temple, Toronto | No absorption on whole brick in 3 days. |
| 68 | $8\frac{3}{4}x4x2\frac{1}{2}$ | ..... | 12.65 | 10.40 | 10.06 | 17.80 | 20.40 | 0.130 | | | | | Dr. Farwell, Burlington | Marked No. 4. |
| 69 | $8\frac{3}{4}x4x2\frac{1}{2}$ | ..... | 13.125 | 10.25 | 10.09 | 21 80 | 23.10 | 0.1490 | | | | | " " | " No. 1. |
| 70 | (a) $8\frac{1}{4}x4x2\frac{1}{2}$ | ..... | 7.125 | 6.50 | 6.25 | 8.79 | 12.3 | 0.0797 | | | | | (a) Canton Shale | |
| | (b) $8\frac{1}{4}x4x2\frac{1}{2}$ | ..... | 6.44 | 5.41 | 5.20 | 16.00 | 19.2 | .1245 | | | | | (b) Dr. Farwell, Burlington (Light) | These four bricks were all tested in rattler at same time. |
| | (c) $7\frac{1}{4}x3\frac{3}{4}x2$ | ..... | 5.25 | 4.90 | 4.78 | 6.66 | 8.9 | .0576 | | No absorption. | | | (c) Temple | |
| | (d) $8\frac{1}{4}x4x2\frac{1}{2}$ | ..... | 6.56 | 5.44 | 5.20 | 17.07 | 20.7 | .1343 | | | | | (d) Dr. Farwell, Burlington (No. 3) | |
| 71 | $8\frac{1}{4}x4x2\frac{1}{2}$ | ..... | 13.06 | 9.34 | 8.78 | 28 40 | 32.7 | .2070 | | | | | Burlington Repressed, No. 1 | 2 bricks. |
| 72 | $8\frac{1}{4}x4x2\frac{1}{2}$ | ..... | 13 31 | 8.84 | 8.59 | 33.00 | 35.4 | 0.2200 | | | | | Burlington, No. 2 | 2 bricks. |
| 73 | $8\frac{1}{4}x4x2\frac{1}{2}$ | 2.23 | 6.50 | 5.56 | 5.44 | 14.40 | 16.1 | 0.1037 | 68.945 | 69.59 | 0.93 | 3 | " No. 3 | |
| 74 | $8\frac{1}{4}x4x2\frac{1}{2}$ | 2.36 | 21.65 | 19.68 | 18.75 | 9.10 | 13.4 | 0.087 | 7 16 | 7.28 | 1.64 | 4 | Standard Canton Shale Holloway Block | Absorption in one day same as in four days. |
| 75 | $8\frac{1}{4}x4x2\frac{1}{2}$ | ..... | 20.94 | 18.31 | 16.31 | 12.50 | 22.1 | 0.1434 | 6.59 | 6.72 | 1.97 | 4 | Holloway Canton Repressed | |
| 76 | $8x4x2\frac{3}{4}$ | 2.21 | 18.20 | 15.31 | 14.20 | 15.80 | 21.9 | 0.1295 | 5.94 | 6.03 | 1.51 | 4 | Don Valley | The whole absorption was taken in 1st 24 hours. |
| 77 | $8\frac{1}{4}x4x2\frac{1}{2}$ | ..... | 22.37 | 18 87 | 16.71 | 15.60 | 24.9 | 0.1623 | 5.24 | 5.28 | 0.76 | 3 | Carrollton Repressed Standard Brick | |
| 78 | $8\frac{1}{4}x4x2\frac{1}{2}$ | ..... | 23.15 | 20.59 | 19.09 | 11 06 | 17 80 | 0.1150 | 6.06 | 6.09 | 0.50 | 3 | " Standard | |
| 79 | $8x4x2\frac{3}{4}$ | 2.21 | 30.31 | 22.125 | 20.40 | 27.00 | 32 70 | 0.1880 | 57.185 | 57.82 | 1.09 | 3 | Don Valley | |
| 80 | $8\frac{1}{4}x4x2\frac{1}{2}$ | 2.37 | 28.78 | 25.62 | 24.75 | 10.90 | 14.00 | 0.0908 | 100.503 | 101.51 | 1.01 | 3 | Standard Canton | Used on Ossington Ave., Dundas to College. |
| 81 | $8\frac{1}{4}x4x2\frac{1}{2}$ | ..... | 26.31 | 20.31 | 18.90 | 22.80 | 31.60 | 0.2011 | ..... | ..... | ..... | ..... | Dr. Farwell, Burlington | |
| 82 | (a) | ..... | 14.44 | 13.50 | 12.50 | 6.5 | 13.10 | 0.085 | ..... | ..... | ..... | ..... | Standard Canton | |
| | (b) | ..... | 12.00 | 10.50 | 9.12 | 12.5 | 24 00 | 0.1419 | ..... | ..... | ..... | ..... | Don Valley | |
| 83 | $8\frac{1}{4}x4x2\frac{1}{2}$ | ..... | 24.125 | 20.56 | 19.75 | 14.6 | 18.10 | 0.1070 | 5.00 | 5.18 | 3 60 | 3 | " " | |
| 84 | $8x3\frac{3}{4}x2\frac{1}{2}$ | 2.31 | 25.81 | 23.87 | 22.44 | 7.5 | 13.00 | 0.0821 | 5.58 | 5.65 | 1.25 | 3 | Ontario Paving Brick Co | Repressed brick. |
| 85 | $8x3\frac{3}{4}x2\frac{1}{2}$ | 2.31 | 25.87 | 23.44 | 22.31 | 9.3 | 13.78 | 0.0870 | 96.802 | 98.57 | 1.79 | 3½ | " " " " | " " |
| 86 | $8x4x2\frac{1}{2}$ | ..... | 11.94 | 10.00 | 9.56 | 15.3 | 19.80 | 0.1170 | ..... | ..... | ..... | ..... | Don Valley | |
| 87 | $8x3\frac{3}{4}x2\frac{1}{2}$ | 2.31 | 12.59 | 11.34 | 10.68 | 9.9 | 15.7 | 0.095 | ..... | ..... | ..... | ..... | Ontario P. B. Co | These were culls from Selby Street. |
| 88 | $8\frac{1}{4}x4x2\frac{1}{2}$ | ..... | 21.94 | 21.00 | 20.50 | 4.00 | 6.5 | 0.043 | 7.225 | 7.24 | 0.28 | ..... | Standard Shale Brick Exchange | Amelia Street work. |
| 89 | ..... | ..... | 18.53 | 15.44 | 14.75 | 16.6 | 20.34 | ..... | ..... | ..... | ..... | ..... | Don Valley | These were tested in rattler at same time. |
| 90 | $8x3\frac{3}{4}x2\frac{1}{2}$ | 2.31 | 6.31 | 5 78 | 5.71 | 8.4 | 9.5 | .0604 | ..... | ..... | ..... | ..... | Ontario Paving Brick Co., Selby Street | |

Size of Tumbler, 24 x 37 inches inside; 200 lbs. foundry shot; 30 revolutions per minute.

this point, the clay will melt and run entirely out of shape. The usual time for burning takes from 13 to 15 days, after which the kiln is gradually cooled for about 10 days, and great care is necessary to prevent chilling, which would cause the bricks to become glassy and brittle. By allowing the heat to decline slowly, they are toughened, or more properly speaking, annealed. The temperature required to thoroughly burn this class of material is between 1800 and 1900 deg. Fah.

(*See Table.*)

The accompanying table illustrates the brick tests made during the past year. Whenever possible, three bricks of each sample were always used in the abrasion test, with the usual addition of 200 lbs. of foundry shot. There is little doubt that where there are only a few bricks in the rattler, the loss by impact and abrasion must be less than when the rattler contains a large number. On the other hand, too many bricks in the rattler must have a tendency to reduce the result of wear and tear, causing the bricks to crowd in the cylinder, and thus reducing the length of fall. What the difference in these losses may be I have not yet taken any means to ascertain. In order to make such an experiment, the bricks with which such a test should be made ought to be all taken from the same kiln, and as near as possible from the same place in the kiln, so that they may be of equal texture and hardness, and I suggest that during the coming year a series of experiments should be carried on with a view of ascertaining this point.

In several places in the United States brick pavements have been laid with the bricks placed upon the surface of old macadam roadways, and with successful results. It is necessary, however, to place a cushion of sand of from one to two inches in thickness upon the surface of the roadway to bed the bricks in, otherwise it has been found that the bricks got broken from uneven bearing. There are numerous broken stone roadways in Toronto which could be utilized in this manner when the residents desire a cleaner and less dusty class of roadway. As there has been some doubt of the durability of brick, and also the advisability of laying brick pavements on sand or gravel foundations, enquiries were made at various Cities in the United States where they have been using similar pavements to a large extent, and the following is a synopsis of the results obtained:

Tonawanda, N. Y.—The brick pavements in this City are all laid on concrete foundations or on 6 in. to 8 in. of broken stone thoroughly rolled, upon which a sand cushion is placed. They have in all 7 miles of this class of pavement. Webster Street, which was laid with a repressed fire clay brick on a broken stone foundation in 1890, is in very good order and has so far required no repairs. The travel upon this street is about the same as on Adelaide Street, between Simcoe and Spadina. Mr. Barrally, the City Engineer of this City, informs me that the concrete foundations are made with native cement, and the difference in cost between broken stone foundations and concrete being very small, the latter were finally adopted. The joints are all filled with grout or tar.

Buffalo, which has the largest amount of asphalt on this continent, has lately been laying brick pavements, but these are still under guarantee by Contractors and are all laid on concrete foundations. The travel upon them is fairly heavy and they are in good order.

In Cleveland, the City Engineer, Mr. Rawson, says:—"In answer to your enquiry in reference to earth foundations for brick pavements, as used in this City, I would say that, commencing with the first pavement laid in 1889, all brick pavements thus far laid have been placed upon an earth foundation, which, in nearly every instance in this City, is sand or gravel. In two or three instances we have excavated a clay subsoil, put in a ballast of sand or gravel one foot in depth and placed the brick directly upon this ballast, after having been carefully prepared. Our custom is to thoroughly solidify the foundation before the bricks are placed upon it. This is done by a thorough puddling or flooding of the street from kerb to kerb, and then rolling with a 7 or 8 ton roller very thoroughly. The beds are then brought to the proper curvature by a wooden scraper, and the street is then again thoroughly rolled with a hand roller until foot-prints upon the surface are scarcely discernible. Thus far, except in two instances, we have had no trouble with these foundations, and these were over sewer or water trenches, which would have probably displaced a concrete foundation. In other respects these foundations have been entirely satisfactory. It should be added that our brick pavements are mostly placed on residential or light traffic streets."

All bricks used in this City are repressed, some are fire clay and some shale. There are $29\frac{1}{4}$ miles of this class of pavement in Cleveland.

In Wheeling, West Virginia, a city with a population of about 40,000, there are 15 miles of brick pavements almost entirely laid on gravel foundations. They have in use a fire clay brick, some of which has been down for 12 years and are in fair order yet. Any defects in the surface, the Engineer informs me, are entirely attributable to careless workmanship or defective material; some of the brick laid not being fully up to requirements of the specifications and the foundations not properly consolidated before putting down the brick. One pavement laid in 1882 was placed on 1-inch tarred boards, and the Engineer reports it still in fairly good order, but needing repairs in some places. These roadways are many of them on steep grades, and as the streets are narrow and the loads carried by teams heavy, they are subjected to more than the usual amount of wear and tear. They use brick largely here for sidewalks, but they are irregular and poorly laid and badly in want of repair, chiefly owing to want of under-drainage; the subsoil is clay.

At Columbus, Ohio, which has a population of 100,000, they have been laying brick for the last ten years on broken stone foundations, but under heavy travel it shows signs of wear, otherwise its streets are standing well. They have 64 miles of brick pavements and propose laying more. They prefer a brick the size of a building brick for paving purposes, with bevelled edges. An attempt was made here to lay bricks on board foundation with 2-inch sand cushion, but it was a failure, owing to the boards swelling and raising the pavement. State Street, laid with fire clay bricks in 1887, has worn very badly. This street was laid on a concrete foundation, but the bricks were of a poor quality and condemned by the Engineer when laid, but subsequently accepted by the Council. The travel on this street is only moderate. One intersection on 3rd Street and State Street was laid one-half with Hallwood blocks filled with tar and one-half with a plain sand filler, and no difference can be detected in the appearance: this has been down for five years and there is about as much travel over it as at the corner of York and Wellington Streets. In this City they use on some of the streets a Hayden block 10 x 5 x 5 inches, which is hollow, the crown being 2 inches thick and intended to give good foothold. It makes a very handsome pavement and so far is quite satisfactory.

Front Street from Main to Mound Street, upon which there is not very heavy travel, is in a very bad condition. It was laid with

common hard-burnt brick on sand and board foundation, and has failed entirely from want of proper surface material. They use a clay cube in this City 4 x 4 x 4 inches for the sidewalks, which makes a very good surface and seems to remain true after considerable wear; it is laid on gravel foundation.

At Cincinnati they have 46½ miles of brick pavements, all of which are laid on concrete foundations, with a 2-inch sand cushion; the concrete is made with native cement. Before filling the joints the surface of the roadway is rolled diagonally with a five-ton roller until absolutely smooth, which is considered preferable to pounding. Mr. Stanley, the City Engineer, states that for travel up to 100 tons per diem per foot width of pavement he considers brick an economical pavement when laid on concrete, but for residential streets a sand or gravel foundation is quite good enough, provided it is well drained and the bricks are well rolled after laying. Two streets, Linn Street and Bay Miller Street, laid with brick on concrete, were entirely failures, and upon enquiry it seems that these two roadways are subjected to a very heavy travel, probably twice as much as upon Yonge Street between King and Queen.

In Milwaukee they have only a small quantity of brick pavements, and they were laid last year, but the Engineer considers that brick laid on sand, with a well drained subsoil, will make a satisfactory pavement for light travel.

In Indianapolis, Indiana (107,000 inhabitants), they have 15 miles of brick pavements, the first of which was laid in 1891 with a very poor class of brick, and is not in good order. The remainder are in good order and the travel upon them is moderate. They are now laying on concrete foundations with sand cushion. Their pavements are wide, 50 feet from kerb to kerb, and very flat in the crown. A Portland cement filler is used here, but the Engineer prefers pitch.

At Dayton, Ohio, with a population of 80,000, they have ten miles of brick and fourteen of asphalt. They have also all the car tracks paved with brick or Hayden block. The streets are wide, one of them, Main Street, being 80 feet between kerbs, and is entirely paved with Hayden block similar to that used in Columbus, and gives a very pleasing appearance. The pavements are all laid on concrete and are in good order, although they are still using horse

cars in some parts of the City where the tracks are paved with brick. Only one street, South Wayne Avenue, shows any signs of wear, and it is a heavily travelled street and has been laid for over five years.

In Detroit they have 17 or 18 miles of brick pavements, and the Engineer prefers a bevelled repressed brick set as closely as possible together. They use a concrete foundation entirely, with sand cushion, and the first pavement, laid in 1890, is still in good order under medium travel. Griswold Street was laid with fire-clay brick in 1891 and is still in good order. The remaining mileage has been laid too recently to judge as to its wearing capabilities, but the Engineer states that the only failures they have had are entirely attributable to inferior brick.

The general opinion among the various Engineers communicated with seems to favor brick laid on gravel or sand for light travel, provided the foundation is properly prepared and the joints well filled with pitch or grout filler.

Objections are made to grout as a filler on the ground that it makes a noisier pavement than where pitch is used, whereas the only objection raised to pitch was its tendency to crawl to the edges, which I think is entirely due to defective mixtures. Repressed bevelled bricks also seem to be the favorite, owing to the smoother and more even surface which can be obtained and their uniformity as regards size. An important point, which all the Engineers consulted agreed upon, was that a brick pavement shows more signs of wear during the first 12 months than during the next six years.

Considering the large mileage of cedar block pavements in this City which are in need of immediate renewal to make them decently passable, and the necessity to find a more durable pavement than cedar block, and one impervious to moisture, it would be advisable to repave with brick those pavements most in need of repairs. The gravel under the present cedar blocks could be utilized for a foundation after being well flooded and rolled until solid. Work done in this manner should not exceed $1.15 per square yard, and probably could be laid for less, depending on the cost of the brick. The subsoil in the northern part of the City is peculiarly adapted to this class of work, being a fine yellow sand which will not retain water. The greatest difficulty to get these worn-out roadways re-surfaced has been from the residents objecting to repave with cedar blocks, and at

the same time being unwilling to pay for an expensive pavement, whereas a roadway such as described above should be within the means of every property owner. Should the residents desire to subsequently repave with an asphalt surface it would be quite possible to lay it upon the brick pavement when that is worn down, provision being made for it when the brick is being laid, by keeping the crown of the brick 1½ inches below grade and gaining the remainder in the face of the kerb.

## BENCH MARKS.

Very few additional bench mark plates were placed in position during the past year. This work can only be carried on when the atmospheric conditions are favorable, when the staff is not engaged in more pressing work, consequently the work is not progressing as rapidly as is desirable, and considerable trouble has been experienced in preparing contract plans and other work owing to the want of proper bench marks; numbers of these marks that were placed in position when Mr. Shanly was City Engineer having been effaced or disturbed by building operations. A most objectionable practice, and one highly conducive to error, has been the custom to place bench marks upon the tops of hydrants. These hydrants are often removed for repairs, or raised or lowered to suit the new sidewalks or pavements, and subsequently levels taken starting from a hydrant, apparently identical with the one referred to in the original notes, would be absolutely unreliable without they can be referred to some permanent object of which the elevation is known. Where this has been impossible, it necessitates the entire work being done over again. The bench mark plates now used are of brass with a ledge upon which to rest the foot of the rod, the number of the plate and the elevation above the zero level of Lake Ontario being stamped upon each plate. These plates are placed, when convenient, on all Public School buildings, churches and other permanent stone or brick structures. The method pursued to obtain the levels for these bench mark plates is as follows: Two levellers are employed with two levels, and two rodmen setting up half way between turning points to eliminate any possible error from that source. Each instrument is worked and notes taken independently of the other, but the readings are taken upon the same turning point; no error greater than 0.03 of a foot being allowed per mile. A series of levels were run to the Main Pumping Station and also to the High Level Pumping

Station, and B. M. plates put in at each place. Levels were also given for a gauge to be placed in the Main Pumping Station so that the height of the water in the harbor could be readily ascertained without reference to the Harbor Master's gauge at the Queen's Wharf, which I have found to be subject to irregularities in elevation.

## STREET RAILWAY PAVEMENTS.

A complete re-measurement of all the street railway tracks was undertaken in conjunction with officials appointed by the Toronto Railway Co. for that purpose, and from these measurements plans were compiled showing the complete mileage and the position of curves, turn-outs, switches, etc., in the system. This was done for the purpose of lessening the labor of making up the quarterly mileage returns, and as there had been no continuous measurement made since the inauguration of the electric system. New car tracks were laid on Ossington Avenue, Avenue Road, Simcoe Street, York Street and Station Street. On Ossington Avenue the pavement laid between the car tracks was brick on concrete with scoria alongside the rails; on Avenue Road asphalt was laid with granite setts alongside the rails: on Simcoe and York Streets, below Front Street, where the grade is heavy, the whole space was paved with granite blocks on concrete, whilst on Station Street scoria blocks were used. The experience already gained of asphalt for paving material between the street car tracks is not such as to invite an additional mileage of this class of material.

In almost every instance where it has been placed between the rails it already shows signs of wear and decay, and the only classes of pavement suitable for this position are brick, scoria and granite setts, which I believe are not only more durable, but cheaper in the end. On McCaul Street, which was laid with considerably more crown between the tracks and with scoria blocks laid as stretchers, the pavement seems to stand rather better than on any of the other streets, and the water does not seem to lodge alongside the toothing in the same manner as when the blocks are laid as headers and stretchers. This is not altogether attributable to the additional camber, but principally to the fact that where the scoria blocks are laid as stretchers only, a better compression of the asphalt is obtained than where the blocks are placed in the form of toothing. It has

been suggested by the bicyclists in this City, that the "devil-strip" should in all cases be laid with brick for their benefit. When renewing the street railway pavements I think their request might be complied with, as I cannot see any objection to their suggestion; the wear upon that portion of the roadway by vehicles, even in those sections of the City where the travel is greatest, being very small.

An examination was made of the cedar block pavements laid between the car tracks on Spadina Avenue, Queen Street, west of Bathurst, and King Street east of Sherbourne, which shows that the blocks are wearing very considerably, and will soon require to be renewed. Some of the blocks on Spadina Avenue have already had to be replaced; this wear occurs exactly in the centre of the tracks, and is caused entirely by the sharp caulks in the horses' shoes during the spring, autumn and winter.

A hollow once formed at this point acts as a gutter for rain water, and the blocks, thus kept wet and soggy, soon cut to pieces under the wear from the horses' feet. When these pavements were laid, it was anticipated that the sides of the roadways would shortly be repaved, and that the electric car service would compel all vehicles to use the sides of the street. Such, however, has not been the case, and even where the pavements are equally good on the sides and between the car tracks, a large percentage of drivers of vehicles still prefer to follow the lines of the street car tracks. On the three streets previously mentioned, the old cedar block pavements on the sides are in very bad repair, which is an additional inducement to drivers of vehicles, especially those with heavy loads, to use the car tracks in preference to the rough pavements on the sides.

## ASPHALT.

New asphalt roadways were laid on Avenue Road, St. Patrick Street and part of Victoria Street. St. Patrick Street and Avenue Road were cedar block pavements, both of which were in very bad repair, St. Patrick Street especially. On Leader Lane, between King and Colborne, in addition to the asphalt pavement, concrete side walks were placed on either side, a very much needed improvement. The property owners on this lane also had the two adjacent lanes paved with concrete, which will enable the Street Commissioner's Department to keep clean and in good sanitary order what was formerly one of the dirtiest localities in the City. Victoria Street

## Asphalt Pavements.

| Street. | From | To | Pavement. | Kerb. | Class of Kerb. | Width. | Length. | Cost per Lin. Foot, Exclusive of Kerb. | Cost per Lin. Foot, Inclusive of Kerb. | Cost per Sq. Yd. | Completed. | Contractor. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | sq. yds. | lin. ft. | | ft. in. | ft. in. | $ c. | $ c. | | | |
| Avenue Road | Bloor | Davenport Road | 3,408 | | None | 15 4 | 2,289 .. | 4 42 | | ($2 60 asphalt / $ 50 granite.) | May 21, 1895 | Constructing and Paving Co. |
| " | " | " " | 6,066 | 4,860 | 4-in. stone | 22 .. | 2,289 .. | 4 66 | 6 19 | $1 80 | Augt. 29, 1895 | " " " |
| Leader Lane | King | Colborne | 241 | 375 | " " | 10 .. | 197 .. | 3 23 | 4 97 | 2 60 | May 25, 1895 | " " " |
| St Patrick | McCaul | Beverley | 1,634 | 1,238 | " " | 24 .. | 606 .. | 5 76 | 7 22 | 1 85 | Sept. 9, 1895 | " " " |
| *Victoria | Adelaide | Queen | 3,444 | 688 | 6-in. stone | 42 3 | 694 .. | 10 09 | 10 77 | 2 30 | Sept. 28, 1895 | " " " |

* Most of the kerb was previously laid.

## Cedar and Granite Pavement on Concrete

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Avenue Road | Davenport Road | C. P. Ry | 1,524 | | None | 16 6 | 1,196 .. | 2 69 | | ($1 25 cedar. / $ 50 granite) | May 15, 1895 | D. L. VanVlack. |

## Granite Sett Pavements on Concrete.

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| York | Front | Station St | 204 | | None | 8 3 | 219 .. | 2 40 | | $3 60 | Nov. 14, 1895 | Constructing and Paving Co. |
| Simcoe | " | " | 159 | | " | 8 3 | 231 6 | 2 40 | | 3 60 | Nov. 14, 1895 | " " " |

## Scoria Block Pavement on Concrete.

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Station | York | Simcoe | 344 | | None | 8 3 | 620 .. | 2 60 | | $4 00 | Nov. 14, 1895 | Constructing and Paving Co. |

## Brick Pavements on Concrete.

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Selby | Sherbourne | Huntley | 1,195 | 1,236 | 4-in. stone | 18 .. | 584 .. | 3 28 | 4 70 | $1 64 | Oct. 19, 1895 | Mrs. A. Farquhar. |
| Amelia | Parliament | Sumach | 3,330 | 3,418 | " " | 18 .. | 1,465 6 | 3 53 | 5 05 | 1 65 | Nov. 30, 1895 | A. J. Brown. |
| Ossington Ave | Dundas | College | 3,039 | None. | None | 15 4 | 1,943 .. | 4 19 | | ($2 35 brick.. / 4 00 scoria..) | Augt 20, 1895 | John McBean. |

## Cedar Block Pavements on Gravel.

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D'Arcy | McCaul | Spadina | 4,840 | 3,440 | Wooden | 24 .. | 1,724 .. | 1 22 | 1 51 | $0 41 | Augt. 22, 1895 | D. L. VanVlack. |
| Sullivan | Beverley | " | 3,682 | 2,002 | " | 24 .. | 1,001 .. | 1 17 | 1 48 | 0 44 | " " | " " |
| Oxford | Augusta | " | 2,021 | 1,516 | " | 24 .. | 758 .. | 1 09 | 1 33 | 0 41 | Augt. 27, 1895 | Burns & McCormack. |
| Northcotte | Queen | Afton | 4,149 | 3,150 | " | 24 .. | 1,497 .. | 1 23 | 1 55 | 0 45 | Sept. 10, 1895 | D. L. VanVlack |
| Argyle | Dundas | Gladstone | 6,165 | 4,592 | " | 24 .. | 1,162 .. | 1 21 | 1 50 | 0 43 | Oct. 10, 1895 | " " |
| St. Patrick | Beverley | Spadina | 3,048 | 2,181 | 4-in. stone | 24 .. | 1,061 .. | 1 12 | 2 26 | 0 40 | Nov. 16, 1895 | " " |
| Baldwin | " | " | 2,962 | 2,120 | Wooden | 24 .. | 1,056 .. | 1 14 | 1 41 | 0 41 | Oct. 19, 1895 | " " |

## Macadam Roads.

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Beverley | Queen | College | 9,809 | 6,303 | 4-in. stone | 24 .. | 3,373 . | Not completed. | | | | Mrs. A. Farquhar. |
| John | King | Front | 3,436 | | None | 32 .. | 923 .. | 1 25 | | $0 31 | Oct. 31, 1895 | Day labor. |
| Sheppard | Adelaide | Richmond | 1,388 | 832 | Wooden | 30 .. | 116 .. | 1 37 | 1 67 | 0 41 | Nov. 14, 1895 | Day labor. |
| Queen's Park | And Queen St. | College Ave. (west side) | 12,500 | | None | (30 .. / (21 .. | 4,100 . | Not completed. | | | | |

## Concrete Sidewalks.

| Street. | From | To | Side. | Class of Kerbing. | Width. | Length. | Cost per Lin'l Foot. | Completed. | Contractor. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | ft. in. | ft. in. | $ c. | | |
| Lombard | Pt. 88 ft east of Victoria | Church | North | 4-in. stone | 10 .. | 403 10 | 2 55 | June 12, 1895 | A. Gardner & Co. |
| Adelaide | Post Office Lot | Church | North | | 10 6 | 267 .. | 1 89 | May 31, 1895 | Con. and Paving Co. |
| Leader Lane | King | Colborne | Both | | 5 .. | 364 2 | 94 | June 26, 1895 | A. Gardner & Co. |
| Church | Pt. 163 ft. 10 in. north of Wellington | King | West | | 12 .. | 235 .. | 1 95 | July 6, 1895 | " " |
| Yonge | Maitland | Bloor | East | | 12 .. | 2,226 6 | 2 05 | Oct. 8, 1895 | Con and Paving Co. |
| St. George | Roskin | Bloor | East | | 6 .. | 1,257 6 | 1 04 | Sept. 17, 1895 | A. Gardner & Co. |
| Sherbourne | Wellesley | Howard | East | | 6 .. | 1,387 6 | 1 08 | Oct. 9, 1895 | A. J. Brown. |
| Adelaide | Yonge | Bay | North | 6-in. stone | 11 9 | 597 .. | 2 75 | Oct. 21, 1895 | A. Gardner & Co. |
| Isabella | Jarvis | Sherbourne | Both | | 5 .. | 1,839 1 | 85 | Oct. 17, 1895 | J. H. McKnight & Co. |
| Bloor | St. George | Pt. 198 ft. east | South | | 6 .. | 201 8 | 1 04 | Oct. 29, 1895 | A. Gardner & Co. |
| Front | In front of Union Station | | South | | 12 .. | 145 0 | 2 45 | Nov. 7, 1895 | " " |
| Church | Wellesley | Pt. 121 ft. south. | East | | 7 .. | 122 6 | | | Private. |
| Church and Carlton, S. W. cor. | | | | | 7 .. | 120 .. | | | " |
| Queen's Park | In front of Nos. 57 and 63 | | East | | 6 .. | 200 .. | | | " |
| Temperance | In front of No. 38 | | North | | 10 .. | 37 4 | | | " |
| Duchess | Pt. 100 ft. west of Ontario | Ontario | South | | 9 .. | 111 .. | | | " |
| Yonge and Queen, S. W. corner | | | | | 12 .. | 288 5 | | | " |
| " " N.W. " | | | | | 12 .. | 135 9 | | | " |
| Yonge and Melinda, S. W. corner | | | | | 12 & 8 ft. | 157 .. | | | " |

was originally an old broken stone roadway, without proper crown and in bad repair. The broken stone on this street was separated by screening from the excavated material and used in the repairs made to the drive on the westerly side of the Queen's Park. The cost of screening and delivery amounted to 57½ cents per cubic yard.

There are now a little over five miles of asphalt roadways no longer under guarantee by the contractors, which it will be necessary for the City to keep in repair, and during the coming year of 1896 1½ miles more will have to be taken over, making 6½ miles in all.

In 1897 the guarantee will expire on not less than 6¼ miles, and 12¾ miles in all will then be under the control of the City. These pavements require constant attention and small holes or places showing signs of wear should always be repaired without delay, for should they be allowed to remain unattended the damaged area rapidly spreads, especially in wet or damp weather.

Whether it is the intention of the Corporation to keep these pavements in repair by contract or to purchase a small repairing plant for that purpose is a matter that should be settled without delay, so that the necessary arrangements can be made whereby contracts can be let or a repairing plant purchased at once, so that these roadways will not be allowed to deteriorate for want of attention. Having regard to the extensive use of the asphalt pavements by the numerous bicycle riders in this City, it is almost more important to keep the asphalt roadways in perfect order than any other class of pavement in order to avoid accidents, as it is almost impossible to notice holes in the surface after dark owing to the color of the material.

The following table shows the streets paved with asphalt upon which the guarantee has expired or is soon about to expire:

| Street. | From | To | Length. | Date. |
|---|---|---|---|---|
| | | | Feet. | |
| Bay | King | Front | 932 | Nov. 20th, 1893 |
| Jarvis | Queen | Bloor | 6,734 | October 1st, 1894 |
| St. George | Bloor | Bernard | 2,025 | October 9th, 1894 |
| Wellington | Church | Yonge | 900 | June 28th, 1894 |
| Sherbourne | Queen | Bloor | 6,786 | June 1st, 1895 |
| Simcoe | King | Queen | 1,182 | August 1st, 1895 |
| St. George | Bernard | Dupont | 966 | June 14th, 1895 |
| Ontario | Carlton | Howard | 2,824 | July 28th, 1895 |
| Sherbourne | King | Queen | 1,160 | July 2nd, 1895 |
| Bloor | Yonge | Sherbourne | 2,661 | Nov. 18th, 1895 |
| Scott | Front | Colborne | 374 | Nov. 7th, 1895 |
| Total lineal feet.. | | | 26,544 | |

5.027 miles.

Asphalt Pavements upon which the Guarantee will Expire in 1896.

| Street. | From | To | Length. | Date. |
|---|---|---|---|---|
| | | | Feet. | |
| Wellington | Bay | York | 848 | July 18th, 1896 |
| Gerrard | Jarvis | Sherbourne | 934 | July 24th, 1896 |
| Melinda | Yonge | Bay | 587 | August 5th, 1896 |
| Jordan | Wellington | King | 379 | August 5th, 1896 |
| Sherbourne | Bridge | S. Drive | 1,076 | Nov. 11th, 1896 |
| Bay | King | Queen | 1,175 | August 15th, 1896 |
| St. George | College | Bloor | 3,286 | Sept. 25th, 1896 |
| Total lineal feet.. | | | 8,285 | |

1.569 miles.

Extensive repairs were made to the asphalt pavement on King Street, between Simcoe and Sherbourne. This pavement was laid with land asphalt by the Trinidad Asphalt Company, and, as the contractor failed to make the necessary repairs, arrangements were made with the Constructing and Paving Company to put the most dangerous places in proper order. These repairs were chiefly occasioned by the disintegration of the asphalt alongside the street car rails. The total cost of repairs on this contract amounted to $3,660.30, which was paid out of the money held as a drawback upon this pavement.

The contractors for the asphalt pavement on King Street from Simcoe Street westerly, and Queen Street from Yonge Street westerly, expended a considerable sum in making repairs to these two pavements, but a large amount of work will still be necessary before either of these roadways can be taken off the contractor's hands.

Some slight repairs were also made to the College Street asphalt, which is now in good order with the exception of a piece near Bathurst Street, which should be attended to as soon as the weather permits.

Owing to leakages in the water pipes, repairs were necessary to the asphalt pavement and street car tracks on Queen Street near Sumach, Bloor Street near Gwynne, and Carlton Street a little west of Jarvis. In each of these cases the escaping water caused a settlement of the ground over the sewer, and it became necessary to take up the entire pavement, both in the devil-strip and between the car tracks, before the necessary renewals could be made. In all cases the concrete foundations were found to be hard and well mixed.

On Bloor Street the contractors were required to make extensive repairs before that roadway was taken off their hands. On St. George Street, north of Bernard, repairs had to be made to the asphalt pavement from damages caused by a shove or expansion of the concrete. It is difficult to explain this movement of the concrete, which was made with native cement. Upon examining the concrete at this point, it was found that the southerly portion had pushed up over the northerly part causing a ridge of about six inches in the asphalt surface. The ground below is a yellow loamy sand and apparently quite free from moisture, whilst the interior of the broken portion of the concrete seemed moist, and the lower surface of the asphalt was quite damp. The weather, when this break occurred, was extremely warm, and there had been a succession of hot days. I am under the impression that this shove must have happened at a place where a joint had been made between two days' work, and that the face on the northerly portion of the concrete had been left sloped at an angle of about 45 degrees by the workmen when they left off work. An expansion of the concrete then occurring caused the southerly portion to rise on the sloped surface and overlap the northerly portion. What caused the expansion I am at present

unable to state, unless it was attributable to the extremely warm weather. This concrete was laid in 1890. Mr. McWhinnery, of the Warren-Scharf Co., tells me they have been troubled with similar expansions on streets laid with native cement by their Company in other cities.

As bearing upon the foregoing occurrence, there happened about the same date a breakage in two concrete sidewalks, one laid on Sherbourne Street and one laid on College Street, both of which have been down for two or three years. In both cases the concrete rose bodily in the form of an arch from five to seven inches, and the blocks had to be cut out to make repairs. In these cases there is no doubt but that the expansion was caused by the intense heat.

A complete revision of the specifications, both for asphalt paving and other classes of pavement, was made. Among other alterations, that of using a concrete gutter on asphalt roadways was inserted. This was done for the purpose, partly, of cheapening the work, it being cheaper than gutter stone, and partly to do away with the necessity of making repairs to the channels where the asphalt is laid close up to the kerb. At several places between the street railway tracks where there are intersecting curves, it was found necessary to take out the asphalt and insert stone or scoria setts, as the asphalt will not stand the wear and tear at these places. At the intersection of York and Wellington Streets an experiment was made with a new paving material called "Asphaltina." The easterly half of the intersection was laid with this material, but it is too soon to form any opinion as to its durability. The contractors for it claim that it is absolutely impervious to water, and that water lying on its surface will not cause it to decay in a similar manner to Trinidad Asphalt. While the work was in progress I had some of the material taken from the street whilst hot and made into briquettes, having a section of one inch square, the moulds used being the same as those in which the Portland cement briquettes are made. These briquettes were then subjected to a strain of 100 lbs. and stretched from $2\frac{7}{8}$ inches to $3\frac{1}{8}$ inches: they then broke. The time taken to stretch this distance was 2 min. 20 sec. The sand used in making these briquettes would all pass through a 20 mesh. The next test was made for the purpose of ascertaining the actual strength of the briquettes, which were broken in a Fairbanks machine, the average being 372 lbs. per square inch.

RECORD OF SHEET ASPHALT PAVEMENT LAID ON AVENUE ROAD (TRACK ALLOWANCE) BLOOR TO DAVENPORT ROAD, AND LEADER LANE, KING TO COLBORNE STREET, BY THE CONSOLIDATED PAVING CO., TORONTO. WORK STARTED APRIL 16, 1895; WORK FINISHED MAY 21ST, 1895.

| REFINED ASPHALT. | ASPHALTIC CEMENT. No. | ASPHALTIC CEMENT. Penetration. | RESIDUUM OIL. Flash. | Flow. | Susceptibility to Change of Temperature. | Loss at 400° F. for 7 hrs. | Paraffin Scale, Coke, &c. | SURFACE MIXTURE. No. | Bitumen. | Dust. | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Analysis.* | | | | | | | | | | | |
| Bitumen ..... 55.18% | 52 | 73° | 318° F. | 49° F. | —— | 1.32% | None. | 1 | 8.60% | ..... | The material altogether is |
| Inorganic matter ..... 36.02% | 53 | 75° | | | | | | 2 | 7.80 | 33.20% | of very good quality; the |
| Organic matter ..... 8.80% | 54 | 75° | | | | | | 3 | 8.34 | 29.96 | Residuum Oil is the best |
| 100.00 | 55 | 76° | | | | | | 4 | 8.94 | 30.16 | which we have yet re- |
| | 56 | 75° | | | | | | 5 | 7.66 | 29.04 | ceived, and the analyses of |
| | 57 | 76° | | | | | | 6 | 8.24 | 29.76 | of the surface mixtures |
| Petrolene ..... 38.34% | 58 | 70° | | | | | | 7* | 8.14 | 31.46 | show it to be very uniform |
| Per cent. of bitumen petrolene... 69.48% | 59* | 81° | | | | | | 8* | I. 7.68 | 27.92 | in composition. |
| | | | | | | | | | II. 7.70 | 29.50 | |
| Softens at ..... 187°F. | | | | | | | | | | | |
| Flows at ..... 208°F. | | | | | | | | | Lime | | |
| Per cent. of flow ..... 91 | | | | | | | | | ($CaCo_3$) | | |
| | | | | | | | | 4 | | | *Leader Lane. |
| Quality, "Good Lake." | | | | | | | | | | | |
| *Standard Lake Asphalt Analysis.* | | | | | | | | | | | |
| Bitumen ..... 54.77% | | | | | | | | | | | |
| Inorganic matter ..... 35.93% | | | | | | | | | | | |
| Organic matter ..... 9.30% | | | | | | | | | | | |
| 100.00% | | | | | | | | | | | |
| Petrolene ..... 38.74% | | | | | | | | | | | |
| Per cent. of bitumen petrolene.... 70.73 | | | | | | | | | | | |

NOTE.—The petroleum ether used in extractiog petrolene is distilled over between 60° and 80° C. which has been adopted as standard.

RECORD OF ASPHALT PAVEMENT LAID ON AVENUE ROAD (SIDES), BETWEEN BLOOR AND DAVENPORT ROAD, BY THE CONSTRUCTING AND PAVING CO., TORONTO. WORK STARTED 23RD JULY, 1895; WORK FINISHED 29TH AUGUST, 1895.

| REFINED ASPHALT. | ASPH. CEMENT. No. | ASPH. CEMENT. Penetration. | RESIDUUM OIL. Flash. | Flow. | Dist'n at 400° F for 7 hours. | Paraffin Coke, &c | SURFACE MIXTURES. No. | Bitumen. | Dust. | REMARKS. |
|---|---|---|---|---|---|---|---|---|---|---|
| *Analysis.* | | | | | | | | | | |
| Refined Asphalt No. 28— | | | | | | | | | | |
| Bitumeo ..... 54.46% | 60 | 81° | 335° F. | 45° F. | 4.82% | None. | 9 | 8.56% | 31.94 | The material throughout was of good |
| Inorgaoic matter..... 35.45% | 61 | 77° | | | | A little. | 10 | 8.20 | 27.94 | quality aod oniform. |
| Organic matter ..... 10.09% | 62 | 80° | | | | | 12 | 8.56 | 32.04 | |
| Petrolene ..... 46.09 | 63 | 85° | | | | | 13 | 7.70 | 30.30 | |
| Per cent. of bitumen petrolene.. 73.61 | | | | | | | 15 | 7.70 | 31.60 | |
| Physical Tests— | | | | | | | | | | |
| Softens at ..... 182°F. | | | | | | | | | | |
| Flows at..... 196°F. | | | | | | | | | | |
| Per cent. of flow ..... 100 | | | | | | | | | | |
| Qoality, "Good Lake." | | | | | | | | | | |
| For aoalysis of Standard Lake, see Sheet No. 1, 1895. | | | | | | | | | | |

RECORD OF ASPHALT PAVEMENT LAID ON ST. PATRICK STREET, BETWEEN MCCAUL AND BEVERLEY, BY CONSTRUCTING AND PAVING COMPANY. WORK STARTED 15TH AUGUST, 1895: WORK FINISHED 9TH SEPTEMBER, 1895.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Same as that used on Avenue Road. | 66 | 64° | 335° F. | 45° F. | 1.82% | None. | 17 | 8.10% | 27.10% | |
| | 67 | 65° | | | | A little. | 19 | 8.03 | 32.70 | |
| See Sheet No. 2, Refined Asphalt No. 29 | | | | | | | 20 | 7.66 | 30.84 | |
| | | | | | | | 21 | 7.70 | 31.80 | |
| Per cent. of flow ..... 93 | | | | | | | 22 | 8.24 | 35.22 | |
| | | | | | | | 23 | 7.85 | 30.35 | |
| | | | | | | | 24 | 8.00 | 31.90 | |
| | | | | | | | 25 | 9.00 | 30.10 | |
| | | | | | | | 26 | 7.60 | 32.10 | |

RECORD OF ASPHALT PAVEMENT LAID ON VICTORIA STREET, BETWEEN QUEEN E. AND ADELAIDE E., BY CONSTRUCTING AND PAVING COMPANY. WORK STARTED 3RD SEPT., 1895: WORK FINISHED 28TH SEPT., 1895.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| *Analysis of Refined Asphalt No. 34.* | | | | | | | | | | |
| Bitumen ..... 52.82 | 68 | 77° | 350° F. | 43° F. | 5.7% | Paraffin | 27 | 8.20% | 33.30% | The Refined Asphalt was a new ship- |
| Inorganic matter ..... 38.05 | 69 | 77° | | | | none. | 28 | 7.60 | 33.10 | ment recently refined it was |
| Organic matter ..... 9.13 | 70 | 81° | | | | Coke, a | 33 | 7.68 | 30.70 | somewhat irregular in quality. |
| Petrolene ..... 38.65 | 71 | 91° | | | | trace. | 29 | 7.80 | 30.10 | |
| Per cent. of bitumen petrolene .... 73.17 | 72 | 89° | | | | | 30 | 7.90 | 32.80 | |
| | | | | | | | 31 | 8.30 | 32.80 | |
| Physical Tests | | | | | | | 32 | 8.70 | 33.60 | |
| Softens at ..... 187° F | | | | | | | | | | |
| Flows at ..... 212° F | | | | | | | | | | |
| Per. cent. of flow ..... 80 95 | | | | | | | | | | |
| Tensile strength, 450 500 lbs. per sq. inch. | | | | | | | | | | |
| Quality, "Good Lake." | | | | | | | | | | |

The rate of the application of the stress was 1,000 lbs. per minute, and the temperature at which these tests were made 68 degrees Fah. Two more tests were made with briquettes made in a similar manner, but with finer sand, the sand being of sufficient fineness to pass through a 30 mesh. The average length of time under 100 lbs. tensile strain was 8 minutes; the original length of briquettes $2\frac{7}{8}$ inches, average length of stretching $\frac{1}{8}$ of an inch. After remaining 8 minutes under the above strain the rate of stress was increased to 1,000 lbs. per minute, when the average result gave a breaking strain of 299 lbs. per square inch. Similar briquettes made with sand, all of which would pass through a 30 mesh, were broken without first stretching and gave a result of 575 lbs. per square inch; the temperature at which these last briquettes were broken was 69 deg. Fah. I should very much like to pursue this investigation further, especially as regards the tensile strength of this material at varying temperatures: and should an opportunity occur, I would suggest that this be done during the coming year, and regret that owing to the economical views of the council, investigations of this nature will have to be abandoned.

The contractors state that they can lay this material, exclusive of foundation, for under 50 cents a square yard.

In addition to the laboratory work in connection with asphalt pavements, a very thorough analysis of the coal delivered to the Water Works Department was carried out, full particulars of which were given to you from time to time.

An examination was made of a cargo of crude Trinidad Asphalt delivered to the Constructing & Paving Company, at Montreal, for use in this City, and the results obtained from the two samples taken for analysis were as as follows:

| | No. 1. | No. 2. |
|---|---|---|
| Moisture | 17.61 % | 17.21 % |
| Bitumen | 43.83 " | 43.16 " |
| Organic matter (not bitumen) | 8.42 " | 9.75 " |
| Inorganic matter | 30.14 " | 29.88 " |
| | 100.00 " | 100.00 " |
| Petrolene | 26.99 " | 28.19 " |
| Per cent. of bitumen petrolene | 61.60 " | 65.31 " |

Average per cent. of bitumen petrolene, 63.45.

This is a fair sample of Lake asphalt, and was subsequently refined at the Company's works in Montreal for use in this City.

The rock asphalt left by Mr. Ayers for examination, which he proposed to use here, was a calciferous bituminous conglomerate containing 18.8 per cent. of bitumen and 81.20 per cent. residuum, 33 per cent of the latter being composed of insoluble matter, such as clay, quartz, etc. This material is not likely to compete with Trinidad asphalt in this City, owing to the high rates for freight which have to be paid on the material.

During 1894 an examination was made of the surface mixtures of several of the roadways paved with Trinidad asphalt to ascertain if possible whether there was any deterioration in the mixture owing to the weather, full particulars of which were given in that report. In continuation of this enquiry samples of refined asphalt were taken, one No. 28 A, from the interior of a barrel, the other No. 28 B, was taken from the exterior after the barrel had been exposed to the weather for 12 months, and the analysis gave the following results:

| | 28 A. | 28 B. |
|---|---|---|
| Bitumen | 54.46 per cent. | 55.70 per cent. |
| Inorganic matter | 35.45 " | 35.37 " |
| Organic matter | 10.09 " | 8.93 " |
| | 100.00 " | 100.00 " |
| Petrolene | 40.09 " | 35.50 " |
| Per cent. of bitumen petrolene | 73.61 " | 67.32 " |

From the above analysis it can be seen that there has been a loss in the petrolene of $2\frac{1}{2}$ per cent., and by comparison of the percentage of bitumen petrolene a loss of 4.3 per cent.

As the value of an asphalt for paving purposes depends to a large extent upon the amount of petrolene comprised in it, there is evidence here of a decided loss in the cementitious quality of the material owing to exposure.

In connection with the above the following physical tests, which were made upon a piece of Lake asphalt, will be interesting as showing the gradual disappearance of the volatile oils with age. The tests were made in 1894 and this year:

| | 1894. | 1895. |
|---|---|---|
| Specific gravity | 1.3907 | 1.4088 |
| Softens at | 178 deg. F. | 185 deg. F. |
| Flows at | 188 Fah. | 202 Fah. |

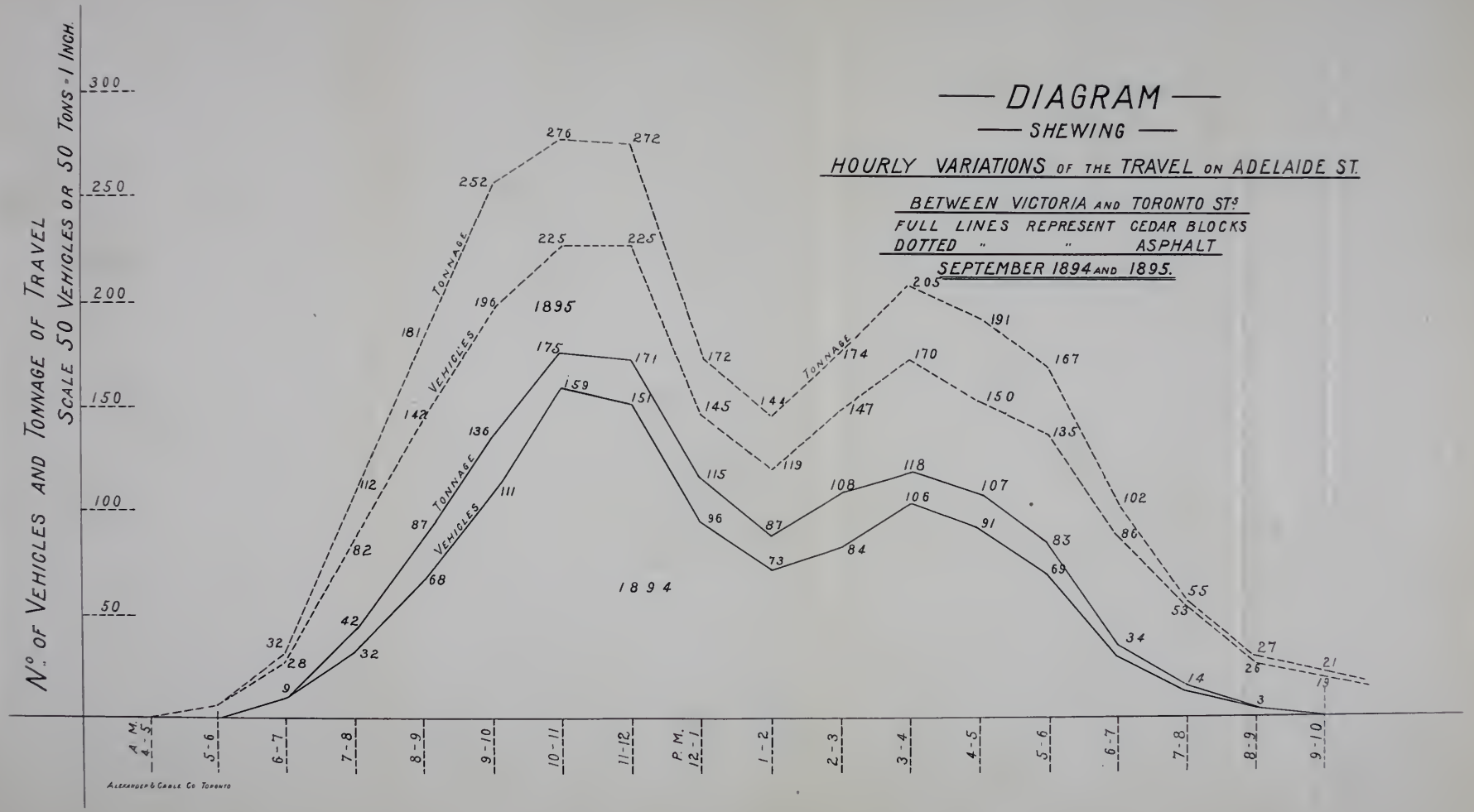


DIAGRAM
SHEWING
HOURLY VARIATIONS OF THE TRAVEL ON ADELAIDE ST.
BETWEEN VICTORIA AND TORONTO STS
FULL LINES REPRESENT CEDAR BLOCKS
DOTTED " " ASPHALT
SEPTEMBER 1894 AND 1895.
N°. OF VEHICLES AND TONNAGE OF TRAVEL
SCALE 50 VEHICLES OR 50 TONS = 1 INCH.
300
250
200
150
100
50
1895
1894
TONNAGE
VEHICLES
A M. 4-5
5-6
6-7
7-8
8-9
9-10
10-11
11-12
P M. 12-1
1-2
2-3
3-4
4-5
5-6
6-7
7-8
8-9
9-10
ALEXANDER & CABLE CO TORONTO

## CONCRETE SIDEWALKS.

The total length of new concrete sidewalks laid during the year was 1.918 miles, or $\frac{3}{4}$ of a mile more than during 1894. The chief objection to these walks has always been on account of the slippery surface of the pavement during frosty weather. This, I think, has been successfully overcome under the present specifications and I anticipate no more complaints from this source. The specifications for this class of work have been entirely remodelled and are found to work satisfactorily. The addition of the tile drains in the foundation is expected to stop that tendency to crack so prevalent in this class of work. The sidewalk in front of Simpson's new building, which was laid late in the season, was unfortunately frozen and the surface has scaled badly and will require renewal in the spring by the contractor.

## CENSUS OF TRAVEL.

In 1894 a census of the amount of travel on Adelaide Street between Victoria and Toronto Streets was taken, the street there being paved with cedar blocks and in a very poor state of repair. Since then an asphalt pavement has been laid down and upon the same days and upon corresponding dates, viz., September 5th to 11th, a new census was taken for comparison with that taken in 1894. During the 1894 census the weather was fine the whole time; but whilst taking this year's census the afternoons of Saturday, September 7th, and Monday, September 9th, were showery, which had an appreciable effect in decreasing the travel. This can be easily seen by reference to the detailed summary attached to this report showing the daily number of vehicles. On comparing the records for the two years, the first peculiarity that strikes the observer is the very small variation in the Sunday travel; in 1894 the total number of horses and vehicles was 175; in 1895 they have only increased to 226, or about 30 per cent., whilst during the week days it was found that the average increase of travel varied from 63 to 69½ per cent. Comparing the returns for 1895 with those published in the 1894 report, it will be seen that there has not only been a very material increase in the number of horses and vehicles using the pavement, but also in the tonnage hauled and the speed at which it is carried.

In 1894 the average tonnage per foot width of pavement was 31.6 tons per day, whilst in 1895 it has risen to 55.07 tons per day, or

over 46 per cent. This in itself is a remarkable increase for a single year, and indicates the value of a good pavement to bring travel to a street.

The returns also show that the tonnage passed much more rapidly over the roadway, and consequently the capacity of the street to convey travel was greatly increased. In 1894 it was shown that 36 per cent. of all horses and 32.7 per cent. of all vehicles traversed the pavement at a walk; in 1895 only 16.1 per cent. of the horses and 13.3 per cent. of the vehicles travelled at a walk, and whilst in 1894 only 67.2 per cent. of the vehicles travelled faster than a walk, in 1895 upwards of 86.6 per cent. were trotting, so that 20 per cent. of all the vehicles which were formerly compelled to walk are now enabled to move at a trot, which is a saving in the time for delivery of goods and transaction of business that is worth consideration.

It will also be noticed that on an average over 688 more vehicles made daily use of this thoroughfare, which must relieve the congestion at the intersection of King and Yonge Streets. The continuation of this pavement from Yonge to York Streets, I consider an absolute necessity, and should be recommended without delay. This would then give a continuous, well paved thoroughfare from Church to Spadina, and increase the value of the adjacent property.

The following table, showing a comparison of the travel for 1894 and 1895, will no doubt be interesting, and from it may be noted the increased weight carried by the vehicles:

## SUMMARY OF RECORDS OF TRAVEL ON ADELAIDE STREET, CITY OF TORONTO,

*Giving the total number of Horses and Vehicles and the Estimated Weight of the same in Tons (2,000 lbs.) from 6 a.m. to 6 p.m*

OBSERVATIONS TAKEN BETWEEN VICTORIA AND TORONTO STREETS.

Width of roadway between kerbs, 43 feet; paved with asphalt in 1894; present condition of pavement good and clean; no car tracks.

| 1895. | | Thursday, Sept. 5th | | | Friday, Sept. 6th. | | | Saturday, Sept 7th. | | | Sunday, Sept. 8th. | | | Monday, Sept. 9th. | | | Tuesday, Sept 10th. | | | Wednesday, Sept. 11th. | | | Average per day for six days. | | | Average Tons per day for each one foot width of Street. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Weather. | Clear, Cloudy or Fair | Clear. | | | Fair. | | | Cloudy. | | | Clear. | | | Cloudy. | | | Clear. | | | Fair. | | | | | | |
| | Rainfall, inches | 0 | | | Inapp. | | | 0.36 | | | 0.00 | | | 0.03 | | | 0.00 | | | 0.00 | | | | | | |
| | Thermometer, 7 a.m. | 64° | | | 66.4° | | | 65.00° | | | 49.00° | | | 56.00° | | | 57.50° | | | 64.50° | | | | | | |
| | " 2 p.m. | 74° | | | 74.0° | | | 74.50° | | | 63.00° | | | 61.00 | | | 70.00° | | | 91.00° | | | | | | |
| | " mean | 67.27° | | | 68.47° | | | 64.65° | | | 56.10° | | | 58.68° | | | 63.00 | | | 76.83° | | | | | | |
| | Barometer | 29.697 | | | 29.657 | | | 29.619 | | | 29.843 | | | 29.749 | | | 29.742 | | | 29.533 | | | | | | |
| | Wind | N.E., light. | | | E. moderate. | | | S.E. to N.W., light. | | | S. very light. | | | N-E. light. | | | E. moderate. | | | S.W. brisk. | | | | | | |
| | | Horses. | Vehicles. | Tons. | Horses. | Vehicles. | Tons. | Horses. | Vehicles. | Tons. | Horses. | Vehicles. | Tons. | Horses. | Vehicles. | Tons. | Horses. | Vehicles. | Tons. | Horses. | Vehicles. | Tons. | Horses. | Vehicles. | Tons. | |
| Vehicles and load under 1 ton estimated at ½ ton.* | Walking | 188 | 166 | 172 | 232 | 196 | 214 | 188 | 159 | 173 | 1 | 1 | 0.5 | 109 | 98 | 103 | 212 | 162 | 187 | 153 | 131 | 142 | 181 | 152 | 165 | 3.93 |
| | Trotting | 1,572 | 1,391 | 1,481 | 1,723 | 1,556 | 1,640 | 1,715 | 1,501 | 1,608 | 107 | 89 | 98 | 1,286 | 1,207 | 1,216 | 1,687 | 1,523 | 1,605 | 1,576 | 1,439 | 1,507 | 1,593 | 1,433 | 1,514 | 36.04 |
| | Speeding | 2 | 2 | 2 | ..... | ..... | ..... | 4 | 2 | 3 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 | 0.6 | 0.9 | .09 |
| Vehicles and load from 1 to 3 tons estimated at 2 tons.* | Walking | 106 | 62 | 177 | 108 | 69 | 192 | 148 | 95 | 264 | 2 | 1 | 3 | 101 | 60 | 171 | 167 | 98 | 280 | 146 | 94 | 261 | 146 | 79 | 224 | 5.60 |
| | Trotting | 91 | 50 | 145 | 147 | 83 | 240 | 181 | 107 | 304 | 15 | 8 | 23.5 | 151 | 88 | 253 | 253 | 148 | 422 | 160 | 92 | 264 | 164 | 95 | 271 | 6.40 |
| | Speeding | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Vehicles and load over 3 tons estimated at 4 tons.* | Walking | 12 | 6 | 30 | 12 | 8 | 38 | 6 | 3 | 15 | ..... | ..... | ..... | 2 | 2 | 5 | 12 | 6 | 30 | 27 | 14 | 70 | 12 | 6.5 | 31 | 0.74 |
| | Trotting | 8 | 2 | 12 | 8 | 2 | 12 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 16 | 5 | 28 | 10 | 3 | 17 | 42 | 12 | 68 | 1.62 |
| Horses not attached to vehicles.* | Walking | 9 | ..... | 4.5 | 11 | ..... | 5.5 | 1 | ..... | 0.5 | 2 | ..... | 1 | 11 | ..... | 5.5 | 8 | ..... | 4 | 4 | ..... | 2 | 7.3 | ..... | 6.7 | 0.14 |
| | Trotting | 3 | ..... | 1.5 | 1 | ..... | 0.5 | 3 | ..... | 1.5 | ..... | ..... | ..... | 4 | ..... | 2.0 | 2 | ..... | 1 | 3 | ..... | 1.5 | 2.7 | ..... | 1.3 | 0.03 |
| | Speeding | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 | ..... | 0.5 | ..... | ..... | ..... | 0.17 | ..... | 0.08 | ..... |
| Specially heavy loads over 5 tons.* | Walking | ..... | ..... | ..... | 8 | 2 | 14 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1.3 | 0.3 | 2.3 | 0.55 |
| Total | | 1,991 | 1,679 | 2,025 | 2,250 | 1,916 | 2,356 | 2,236 | 1,867 | 2,369 | 127 | 99 | 126 | 1,667 | 1,455 | 1,780 | 2,358 | 1,945 | 2,557 | 2,079 | 1,773 | 2,264 | 2150.47 | 1778.4 | 2284.28 | 55.07 |

* All horses estimated at one-half ton.

PERCENTAGE WITH REFERENCE TO SPEED.

| — | Horses. | Vehicles. | Tons. |
|---|---|---|---|
| Walking | 16.1 | 13.3 | 18.7 |
| Trotting | 83.8 | 86.6 | 81.2 |
| Speeding | 0.1 | 0.1 | 0.1 |

PERCENTAGE WITH REFERENCE TO WEIGHTS.

| | |
|---|---|
| Vehicles estimated at ½ ton | 89.2 |
| " " 2 tons | 9.7 |
| " " 4 " | 1.1 |

COMPARISON OF TRAVEL ON ADELAIDE STREET, BETWEEN VICTORIA AND TORONTO STREETS, FROM CENSUS TAKEN IN 1894 AND 1895.

*(For details see Census Returns in 1894.)*

| | 1894. | 1895. | Increase or Decrease. | Per cent. Increase. |
|---|---|---|---|---|
| Average tonnage per foot width of roadway | 31.6 tons | 55.7 tons | 14.47 tons | 46 % |
| Percentage of vehicles estimated at ½ ton. | 93.5 % | 89.2 % | 4.3 % | |
| " " " 2 tons | 6.0 " | 9.7 " | 3.7 " | |
| " " " 4 tons | 0.4 " | 1.1 " | 0.7 " | |
| Percentage of horses walking | 36.0 " | 16.1 " | 20.0 " | |
| " " trotting | 61.0 " | 83.8 " | 19.8 " | |
| " " speeding | 0. " | 0.1 " | 0.1 " | |
| Percentage of vehicles walking | 32.7 " | 13.3 " | 19.4 " | |
| " " trotting | 67.2 " | 86.6 " | 19.4 " | |
| " " speeding | 0.1 " | 0.1 " | ..... | |
| Percentage of tonnage walking | 39.7 " | 18.7 " | 21.0 " | |
| " " trotting | 60.2 " | 81.2 " | 21.0 " | |
| " " speeding | 0.1 " | 0.1 " | ..... | |
| Average No. for 6 days of horses | 1,275½ | 2,150½ | 885 | 69½ % |
| " " vehicles | 1,090⅔ | 1,778⅔ | 688 | 63 " |
| " " tons | 1,328½ | 2,284½ | 956 | 72 " |

Attached to this report will also be found a diagram of the travel from 4 a.m. to 10 p.m., showing the fluctuations according to the time of day, from which it will be seen that from 10 to 12 in the morning and from 3 to 4 in the afternoon are the two busiest times of the day.

## WOODEN BLOCK ROADWAYS.

In the tabulated statement of works constructed during the past season will be found a list showing upon what streets cedar block roadways were re-constructed. As in most cases the gravel bed below the cedar blocks was found in fair order, it was deemed advisable in order to lessen the cost, to reduce the amount of new gravel under the blocks to 2 inches laid upon the old bed, which had previously been raked over and cleared of all dirt or foreign matter which had worked down between the old blocks.

The cost for these re-laid pavements (the blocks being entirely new) did not exceed 54 cents per square yard. After the pavement

had been surfaced and rammed, the whole street was rolled with the City steam roller, after which any depressions were made good by the contractor. The cedar blocks received upon these roadways were of an exceptionally good quality, and in consequence there were few culls and most of the culling was for irregularity in size caused by defective sawing.

These cedar block pavements were in all cases laid upon residential streets, and which were 24 feet wide from kerb to kerb. This width is found ample for any street not used for business purposes and upon which there is a limited amount of travel.

The narrower the carriageway, the better opportunity there is for wide boulevards and handsome shade trees, which always improve the appearance of a thoroughfare when properly cared for. When a larger portion of a street than is necessary is taken up by the pavement, it entails a continuous expense to keep the surface in proper order to sweep and water it. The first cost of such pavement is also greater, and when it becomes necessary to relay or repave, is a heavy burden on the taxpayers, whilst with a narrow carriageway, if it is subsequently found that the amount of travel or business upon the street has so increased as to warrant widening it, this can be easily accomplished by moving the kerbs back and adding such additional width as may be considered necessary.

The following table has been arranged in alphabetical order for easy reference, showing the streets having cedar block pavements for which the time for payment has expired or is shortly to expire:

TABLE No. 6.

| Street. | From | To. | Present Pavement. | Date When Laid. | Date of Expiry. |
|---|---|---|---|---|---|
| Abbs | Brock Ave | West terminus | C. B | 1891 | 1896 |
| Afton | Northcote | Lisgar | " | 1883 | 1894 |
| Alexander | Church | North Mutual | " | 1884 | 1894 |
| Arthur | Bathurst | Euclid | " | 1882 | 1892 |
| " | Dundas | Bridge | " | 1884 | 1895 |
| Augusta | Nassau | College | " | 1886 | 1896 |
| Bathurst | College | Bloor | " | 1884 | 1895 |
| Baldwin | Beverley | McCaul | " | 1884 | 1895 |
| Balmuto | Bloor | Czar | " | 1884 | 1895 |
| Beaconsfield | Queen | Afton | " | 1882 | 1892 |
| Bellevue | College | Bellevue Pl | " | 1882 | 1892 |
| Bellevue Pl | Carlyle | Augusta | " | 1884 | 1896 |
| Bellwoods | Queen | Mansfield | " | 1883 | 1892 |
| Berkeley | Gerrard | Carlton | " | 1882 | 1891 |
| " | Wilton | Gerrard | " | 1883 | 1892 |
| Bishop | Davenport | West terminus | " | 1886 | 1896 |
| Booth | Queen | Eastern | " | 1891 | 1896 |
| Bolton | Kingston Rd | Gerrard | " | 1886 | 1896 |
| Broadview | Queen | Eastern | " | 1891 | 1896 |
| Brookfield | " | Maple | " | 1882 | 1892 |
| Brock | Dundas | College | " | 1888 | 1895 |
| Brunswick | College | Ulster | " | 1882 | 1892 |
| " | Ulster | Bloor | " | 1884 | 1895 |
| Buchanan | Yonge | Teraulay | " | 1883 | 1892 |
| Brock | Queen | Railway | " | Parkdale | 1896 |
| Brown | Brock | West terminus | " | 1891 | 1896 |
| Cameron Pl | Cameron | Vanauley | " | 1883 | 1894 |
| Cameron | Queen | Bend | " | 1883 | 1892 |
| Carlton | Sackville | Sumach | " | 1885 | 1896 |
| " | Sherbourne | Parliament | " | 1886 | 1896 |
| " | Parliament | Sackville | " | 1884 | 1896 |
| Carlton Ave | Ontario | Easterly | " | 1883 | 1892 |
| Charles | Church | Jarvis | " | 1883 | 1892 |
| Carlyle | St. Patrick | Bellevue Pl | " | 1886 | 1896 |
| Clarence Sq | | | " | 1883 | 1894 |
| Clara | Oak | Orford | " | 1886 | 1896 |
| College | Dufferin | Lansdowne | " | 1888 | 1896 |
| " | Beverley | Spadina | " | 1882 | 1892 |
| " | McCaul | Beverley | " | 1883 | laid by City |
| " | " | Yonge | " | 1885 | laid by City |
| " | Spadina | Bathurst | " | 1884 | 1894 |
| Cottingham | Yonge | Avenue Rd | " | 1886 | 1896 |
| Cowan | King | Queen | " | Parkdale | 1896 |
| Darling | North terminus | End of sewer | " | 1891 | 1896 |
| Davenport Rd | Avenue Rd | North City limit | " | 1883 | 1896 |
| Dean | Wilton | 200 feet west | " | 1886 | 1896 |
| Division | Spadina | Huron | " | 1884 | 1894 |
| Dorset | King | Wellington | " | 1883 | 1894 |
| Dovercourt | Queen | Dundas | " | 1882 | 1892 |
| " | Dundas | College | " | 1884 | 1894 |
| Draper | Front | Wellington Pl | " | 1884 | 1894 |

TABLE No. 6—*Continued.*

| Street. | From | To. | Present Pavement. | Date When Laid. | Date of Expiry. |
|---|---|---|---|---|---|
| Dunn | Queen | Lake | C.B. | Parkdale | 1896 |
| Dundas | " | Arthur | " | 1883 | 1892 |
| Elm Grove | King | Queen | " | Parkdale | 1896 |
| Elliott | Broadview | Bolton | " | 1886 | 1896 |
| Euclid | College | Robinson | " | 1882 | 1892 |
| Fenning | Queen | Humbert | " | 1884 | 1894 |
| Foxley | Dundas | Dovercourt | " | 1883 | 1892 |
| Front | Yonge | Church | " | 1885 | 1896 |
| Gifford | Spruce | Carlton | " | 1885 | 1896 |
| Gladstone | Queen | Dundas | " | 1883 | 1892 |
| Grange | Spadina | Esther | " | 1883 | 1892 |
| Grove | Dundas | Foxley | " | 1884 | 1895 |
| Gwynne | Queen | King | " | Parkdale | 1896 |
| Harbord | St. George | Huron | " | 1882 | 1892 |
| " | Huron | Brunswick | " | 1886 | 1896 |
| " | Brunswick | Borden | " | 1886 | 1896 |
| " | Bathurst | Borden | " | 1886 | 1896 |
| Harris | Queen | Paul | " | 1891 | 1896 |
| Hazelton | Yorkville | Davenport | " | Yorkville | 1896 |
| Henry | College | Baldwin | " | 1882 | 1892 |
| Henderson | Clinton | Manning (300 ft.) | " | 1886 | 1896 |
| Howard | Sherbourne | Parliament | " | 1882 | 1892 |
| Huron | Bloor | Sussex | " | 1885 | 1896 |
| " | Sussex | College | " | 1883 | 1892 |
| Humbert | Dundas | Dovercourt | " | 1883 | 1894 |
| Huntley | Bloor | Earl | " | 1882 | 1892 |
| Jameson | King | Queen | " | Parkdale | 1894 |
| King | Simcoe | Strachan | " | 1883 | 1894 |
| " | Sherbourne | Don River | " | 1883 | 1894 |
| " | Strachan | Armour | " | 1891 | 1896 |
| Kensington Cres. | Park Rd. | Huntley | C.B., tar filling. | 1891 | 1896 |
| Lansdowne | Queen | North limit | C.B. | Parkdale | 1896 |
| Leonard | Nassau | Bellevue Pl. | " | 1886 | 1896 |
| Lippincott | " | Bloor | " | 1885 | 1896 |
| Lisgar | Queen | Dundas | " | 1882 & 1884 | 1892 |
| Lowther | Avenue Rd. | 630 feet west | " | 1885 | 1896 |
| Macdonnell | Queen | North limit | " | Parkdale | 1896 |
| Mansfield | Bellwoods | Clinton | " | 1884 | 1894 |
| Maple Grove | O'Hara | Brockton | " | Parkdale | 1896 |
| Markham | Queen | College | " | 1885 | 1896 |
| Marion | O'Hara | Lansdowne | " | Parkdale | 1896 |
| Melbourne | Dufferin | Cowan | " | Parkdale | 1896 |
| Mercer | John | Peter | " | 1885 | 1896 |
| Metcalf | Carlton | Winchester | " | 1885 | 1896 |
| " | Winchester | Amelia | " | 1888 | 1895 |

TABLE No. 6—*Continued.*

| Street. | From | To. | Present Pavement. | Date When Laid. | Date of Expiry. |
|---|---|---|---|---|---|
| Murray | Caer Howell | North end | C. B. | 1882 | 1892 |
| McCaul | Queen | College | " | 1882 & 1883 | 1887 & 1894 |
| McGee | " | Eastern | " | 1885 | 1896 |
| Napier | Munro | Lane | " | 1891 | 1896 |
| Nassau | Spadina | Bathurst | " | 1882-1884 | 1894 |
| Niagara | Bathurst | King | " | 1885 | 1896 |
| O'Hara | Queen | Lots 1 and 2 | " | Parkdale | 1896 |
| Ontario Pl | Ontario | 270 feet west | " | 1886 | 1896 |
| Orde | Queen St. Coll. Av | Near McCaul | " | 1882 | 1892 |
| Orford | Parliament | Easterly | " | 1885 | 1896 |
| Oxford | Lippincott | Bellevue | " | 1884 | 1895 |
| " | Bellevue | Augusta | " | 1885 | 1896 |
| Palmerston | College | Arthur | " | 1884 | 1896 |
| " | Arthur | Robinson | " | ..... | 1896 |
| Parliament | Wellesley | Howard | " | 1888 | 1895 |
| " | Queen | Gerrard | " | 1882 | 1892 |
| Peel | Gladstone | Dufferin | " | 1884 | 1894 |
| Prince Arthur | Avenue Rd | 650 feet west | " | 1886 | 1896 |
| Prospect | Rose | Parliament | " | 1882 | 1892 |
| Queen | West aproach to Subway. | West City limit.. | " | Parkdale | 1896 |
| " | Yonge | Bathurst | " | 1883 | 1894 |
| Richmond Pl | Richmond | South end | " | 1885 | 1896 |
| Robinson | Bathurst | Euclid | " | 1886 | 1896 |
| Robert | College | Bloor | " | 1884 | 1894 |
| Rolyat | Dundas | Grove | " | 1885 | 1896 |
| Ross | Cecil | College | " | 1883 | 1894 |
| Russell | St. George | Spadina | " | 1883 | 1892 |
| Sackville | Wellesley | Cemetery | " | 1888 | 1895 |
| Shaw | Queen | Arthur | " | 1884 | 1895 |
| Spadina | " | College | " | 1884 | 1894 |
| " | " | King | " | 1883 | 1894 |
| " | King | Front | " | 1882 | 1892 |
| Spruce | Parliament | Sumach | " | 1884 | 1895 |
| Stafford | King | Defoe | " | 1886 | 1896 |
| Stewart | Portland | Bathurst | " | 1884 | 1894 |
| St. Patrick | Denison | " | " | 1884 | 1895 |
| St. Mary | North | Queen's Park | " | 1883 | 1894 |
| St. Joseph | Yonge | St. Vincent | " | 1881 | At City's expense. |
| Sumach | Gerrard | Carlton | " | 1883 | 1892 |
| " | Carlton | Winchester | " | 1883 | 1894 |
| " | Winchester | Wellesley | " | 1884 | 1896 |
| " | Wellesley | Amelia | " | 1885 | 1896 |
| Sussex | St. George | Huron | " | 1885 | 1896 |

TABLE No. 6—*Continued.*

| Street. | From | To. | Present Pavement. | Date When Laid. | Date of Expiry. |
|---|---|---|---|---|---|
| Tranby | Bedford | 157½ feet east | C. B. | 1891 | 1896 |
| Trinity | King | South terminus | " | 1884 | 1895 |
| Turner | Tecumseh | West end | " | 1886 | 1896 |
| Vermont | Bathurst | Manning | " | 1891 | 1896 |
| Victor | Broadview | DeGrassi | " | 1886 | 1896 |
| Wascana | Sumach | 186 feet easterly | " | 1891 | 1896 |
| Washington | Spadina | Huron | " | 1886 | 1896 |
| Waterloo | Gladstone | Dufferin | " | 1886 | 1896 |
| Wellesley | Sackville | Sumach | " | 1885 | 1896 |
| " | " | Parliament | " | 1884 | 1894 |
| Wellesley Pl. | Wellesley Cres. | North end | " | 1881 | 1891 |
| Wellington | Peter | Clarence | " | 1886 | 1896 |
| Wilcox | St. George | Robert | " | 1886 | 1896 |
| Winchester | Ontario | Parliament | " | 1883 | 1894 |
| Woolsley | Esther | Bathurst | " | 1883 | 1892 |
| York | Queen | King | " | 1884 | 1895 |
| " | King | Front | " | 1885 | 1896 |

The dangerous condition of many of these roadways, which I have already called attention to in last year's report, makes it imperative that some action be taken to put them in order to avoid the City being subjected to suits for damages, should an accident occur upon any of them.

## INTERSECTIONS.

During the year several intersections were repaved with stone setts; as these were done by day labor full particulars will be found in the Street Commissioner's Report.

The intersection of College and Spadina Avenue should be repaved with some more suitable material than cedar block, preferably brick. When this work is performed care will have to be taken to provide a different system of drainage at the north-west and south-west corners, where the street was widened, in order to get rid of the present unsightly hollows.

The intersection of Beverley and College Streets will also require paving in order to suit the grade of the new macadam roadway being constructed on Beverley Street.

BROKEN STONE ROADWAYS.

A broken stone roadway was laid on Beverley Street, upon receipt of a petition from the residents, in order to replace the old cedar block pavement, which had become totally worn out. The roadway was composed first of a foundation of large broken stone from six to eight inches in size, upon which was placed two layers of small broken stone, each layer four inches in thickness, the lower course being of broken limestone and the upper one of granite. Finally, the surface was dressed with screenings from the broken granite, care being taken throughout that no dirt or other foreign material was introduced in the layers of broken stone. Each layer was rolled with a 15-ton steam roller until thoroughly consolidated. Owing to the lateness of the season at which the work was commenced, and to delays on the part of the contractor, snow fell in considerable quantity and the weather became so cold that it was quite impossible to satisfactorily complete the work. Although the contractor left the road so that it could be used during the winter without injury in the spring, it will be necessary to top dress the surface and re-roll a large portion of it, especially at the northern end, where, in spite of all efforts to get rid of the snow, a certain quantity became incorporated with the broken stone.

During the cold weather a difficulty was experienced with the steam roller owing to the frost getting into the wheels and causing them to pick up the surface of the roadway. This was overcome by turning a jet of steam through a hose upon the wheels from time to time until they were free from ice and frost, after which we had no more trouble. Some inconvenience was also occasioned owing to the water freezing in the pump and injector. This, however, was easily remedied by leading a small pipe from the boiler into the water tank so that steam could be passed into the latter.

Under the broken stone foundation tile drains were laid on both sides of the sub-grade about three feet distant from the kerb line, and were extremely useful in keeping the bed free from water during the wet weather which occurred during construction. This roadway has a good fall from north to south, and therefore it was not

necessary to give it as much crown as one with a flatter grade. The majority of broken stone roadways in this City have too much barrel and should be cut down and properly shaped and graded to keep them in good order. This practice of putting an excessive crown on macadam roadways has a tendency to destroy the surface and is almost as bad as no crown at all. What is required is only sufficient slope to shed the surface water and yet flat enough to encourage drivers of vehicles to use all parts of the surface and thus minimize the formation of ruts in which water stands and destroys the surface of the roadway. The only way in which roadways of this description can be kept in good order is by constant supervision, and immediately upon the formation of a rut or inequality in the surface, means should be taken at once to have it repaired. To do this the place should be carefully picked round so as to make a square shoulder against which to fit the new stone, which should not be larger than one inch at its greatest dimension, and the stone, after being put in place, should be pounded or rolled until solid; no sweepings or clay or loamy material should ever be allowed to be placed upon a roadway of this description under pretence of binding the materials together, as it only tends to work into mud during wet weather, and this is the greatest enemy to a good surface. In repairing this class of roadway another point often overlooked is the fact that stone used for repairs should be of a similar character and texture to the stone used during construction, and that a soft stone should never be used to repair a hard stone surface, nor a hard stone to repair a roadway upon which soft stone was originally placed. If this is neglected the result is a lumpy, uneven surface, owing to the patches wearing unevenly, causing great annoyance to the travelling public. Whilst building this roadway exception was taken to the fact that no fine material was placed in the two lower layers, and that they were rolled until solid before the next coat was put on.

Where a steam roller cannot be had, it may be necessary to add a certain quantity of gravel or similar fine material for the purpose of binding the loose stone together, but I am satisfied that this is a detriment to the road, and that the cleaner the stone and freer from fine material, the longer the road will last.

In some places they still adhere to this practice of mixing gravel with the broken stone as a binding material, and no doubt very good

roads can be made in this manner, but I believe it to be at the expense of the durability of the road, and that they would make a very much better and more lasting roadway if the fine material were left out.

QUEEN'S PARK DRIVE.

Extensive repairs were made to the roadway on the westerly side of the Queen's Park. The surface was entirely re-made and where necessary brought to a proper grade. Any stone existing on the roadway was utilized as far as possible, being first screened and re-broken: where necessary, new material was added to assist in bringing the surface to a proper level.

Unfortunately the funds for this work were very limited and did not permit laying as thick a coating of stone as was desirable, the average depth not exceeding four inches. A coating of from ½ to 1 inch of gravel was spread on the surface, and the whole roadway was then consolidated with the steam roller. The cold weather coming suddenly made it necessary to stop work near Caer Howell Street, and the southerly portion of the roadway will have to be completed in the spring. There was some difficulty in getting rid of the water from the sides of this roadway, as there are no drains from Bloor Street to College Street into which to lead the water.

I remain, etc.,

H. D. ELLIS,
*Assistant Engineer on Roadways.*

REPORT OF

# Assistant Engineer in Charge of Bridges and Special Work

TORONTO, December 31st, 1895.

E. H. KEATING, ESQ.,
*City Engineer.*

DEAR SIR,—I beg to submit a statement of the work done under my charge during the past year:

## GERRARD STREET BRIDGE.

The wearing course of two-inch oak on this bridge is not lasting as anticipated. In very many places it is worn through to the under planking, and has been repaired by inserting new boards in a large number of places, so as to make it last for the present year, but the whole wearing course will have to be renewed in 1896, and very probably some of the under-planking also.

The whole of the steel and ironwork has been thoroughly scraped and repainted two coats. The estimated surface in this bridge is about 62,000 superficial feet, and the cost of paint, brushes, etc., used was $190, and wages $498, equal to 1.10 cents per superficial foot.

## GLEN ROAD BRIDGE.

A new upper or wearing course of two-inch plank has been put on this bridge and the sidewalk planking repaired. The floor beams in this bridge being of wood, it will be very necessary in 1896 to replace these with steel ones; they are very much decayed, and the iron parapet depends entirely on them, and has become in many places very shaky, so much so that I had to put wood stays under the sidewalks to support them.

For the convenience of drivers on the new Rosedale Ravine Drive it was necessary to remove two series of the lower bracing. This has been done by shortening the braces and placing them about eight feet higher.

The whole of the steel and ironwork has been thoroughly scraped and repainted two coats. The estimated surface in this bridge is about 30,000 superficial feet, and the cost of paint, brushes, etc., was $121, and wages $718, equal to 2.80 cents per superficial foot.

### HUNTLEY STREET BRIDGE.

A new upper or wearing course of two-inch plank has been put on this bridge and the sidewalks entirely renewed; the whole of the steel and ironwork has been thoroughly scraped and painted; this bridge is now in very good condition. Some attention ought to be given to the eastern side of the southern approach; the driveway into the ravine should be fenced off from the street; the estimated surface to be painted is about 40,000 superficial feet, and the cost of paint, brushes, etc., was $122, and wages $800, equal to 2.30 cents per superficial foot.

### SHERBOURNE STREET BRIDGE.

Although the upper course of this deck is oak, it is very badly worn; it has been repaired to make it last for the year, but will have to be thoroughly overhauled in 1896; the wheel guards are very much decayed and have been patched for the present. On account of the large quantity of water coming from the north over the asphalt pavement, the gullies provided were unable to carry it away, consequently much earth was washed from in front of the abutment. More track gullies have been put in, and a large wooden water chute constructed under the bridge to carry the water further down the ravine. The earth has been put back against the abutment and made secure.

The whole of the steel and ironwork has been thoroughly scraped and painted two coats. The estimated surface to be painted is about 69,500 superficial feet; and the cost of paint, brushes, etc., was $134, and wages $1,076, equal to 1.75 cents per superficial foot.

### WINCHESTER STREET BRIDGE.

This bridge has been thoroughly tightened up and repaired where found necessary, and all painted two coats.

EASTERN AVENUE BRIDGE.

On examining this bridge it was found that some of the posts and a portion of the top chord was much decayed. The decayed portion of the posts was cut out and new pieces put in to enable this bridge to last a little longer. A weather board roof has been placed over top chords and the whole bridge painted two coats. The deck of this bridge is very much worn, and will have to be entirely renewed in 1896.

CRAWFORD STREET BRIDGE.

Most of the bents under this bridge were decayed near the ground and have been repaired either by splicing or renewing; the deck was entirely removed; the decayed joists were in some cases removed and in others reinforced by nailing planks alongside; new wheel guards were put in and stays for parapet placed under sidewalk; new planking, 2-inch and 3-inch, placed on the deck; new 2-inch plank sidewalks; parapet repaired and straightened; bridge is now in good condition.

SHAW STREET BRIDGE.

The bents under this bridge were found to be in a very rotten and dangerous condition: in nearly all cases the lower portions were removed, new mudsills put in and legs spliced. The whole of the deck had to be removed; many of the joists replaced or reinforced; new wheel guards put in stays under sidewalks to strengthen parapet; new deck of 2 and 3-inch plank: new sidewalk of 2-inch plank: the parapet also has been straightened and repaired.

On the east side of bridge a strong stairway has been erected to give access for people on Sully Crescent to College Street.

HUMBER BRIDGE.

This bridge I found on examination to be in a very rotten and dangerous condition. The old Queen trusses at the east end of the bridge were entirely removed, and a centre bent put in to support the deck. The whole of the timber in the supports was carefully examined, and all unsound and decayed pieces removed and new ones inserted. The trusses of two main spans were overhauled and screwed up: the whole of the old deck was removed and a new one

BRIDGE AT ISLAND PARK, TORONTO

of 3 and 2 inch plank put in; many of the joists were found to be entirely decayed, and were therefore replaced by new ones. This bridge is now in fairly good condition, but must be replaced in the near future with a new one.

STRACHAN AVENUE BRIDGES.

These bridges were again patched up as far as handrailing and supports; a new wearing course of 2-inch plank has been placed over the whole surface; the sunken portion was raised and thoroughly packed. These bridges, I consider, are in a very dangerous state, and should be replaced by more permanent structures at an early date.

ISLAND PARK BRIDGE.

This bridge is an ornamental one of three arch spans, the centre one being 60 feet in the clear, and the two outer spans 30 feet in the clear; the roadway is 22 feet wide between parapets. The whole structure is of steel and cast iron, no woodwork being used except for bridge deck. The design for the bridge and all working drawings of the cast iron parapet, galvanized iron columns and other ornamental work were made in this office.

The contract for the masonry, piers and abutments was let to Mr. A. J. Brown for the sum of $2,949 on the 8th of November, 1894, but nothing was done to speak of until the beginning of this year. This work was done in a very substantial and satisfactory manner, and was ready to receive the superstructure by the time it commenced to arrive.

The contract for the superstructure was let on Feb. 25th to the Central Bridge Co., Peterborough, for the sum of $3,660; the work was carried out in strict accordance with the drawings. The steel work was erected by the 24th of May, and the entire structure was finished, painted and opened for public traffic on the 15th of June.

QUEEN STREET SUBWAY.

Entire new detail plans and specifications have been made for this work.

CATTLE MARKET BRIDGE.

On account of the late fire, in which part of the wood ramps were destroyed, the south span of steel girders and supports were very

much injured; the floor girders were so much distorted that they had to be entirely cut to pieces and rebuilt; the lattice work in the main girders had to be entirely removed, the top and bottom chords straightened as far as possible, and all the lattice bars straightened or removed and re-rivetted. One of the end pillars was much bent; this also had to be removed and straightened, although this work has been carefully done. The girders are still somewhat out of shape, and will have to be renewed much earlier than would otherwise have been necessary. The timber work in ramps and bridge decks were removed by Mr. Coatsworth for Property Committee.

Yours faithfully,

JOHN WILLIAMS,
*Bridge Engineer.*

# SURVEY DEPARTMENT.

TORONTO, December 31st, 1895.

E. H. KEATING, ESQ.,
*City Engineer.*

DEAR SIR,—Below I submit a report of work done under my charge during 1895.

During the past year this Department has been occupied generally in making the usual surveys and collecting other information which from time to time is required by all the Departments in the City Hall, a large amount of this work being for the Law Department. These matters necessitated searches in the Registry Office, Land Titles Office, and the Crown Lands Department and elsewhere, in order to make the reports required thorough and accurate.

## TAX SALES.

During the past year, in connection with this matter, some 400 descriptions had to be written for the Treasurer's Department: these in many cases required special survey and search.

My personal attention had to be given to the following subjects, owing to their importance: The matters arising out of the Esplanade and Windmill Line Agreements, connected with York Street Diversion, York Street Overhead Bridge, Station Street, John Street Bridge, Bay Street Level Crossing, together with descriptions and applications for water lots and street slips from both the Dominion and Ontario Governments, involving numerous conferences with the Solicitor's Department, Mr. Christopher Robinson, Q.C., and with the solicitors and representatives of the Railway Companies.

## ROSEDALE VALLEY ROAD.

In connection with Rosedale Valley Road, the acquisition of the land required is now all complete, except those portions of the lands of Sir Frank Smith and Mr. Keily. It may be necessary in these

cases to go to arbitration. I might here mention that the acquisition of the low lands belonging to Sir D. L. Macpherson, near Yonge Street, is complete, and the lands are now being improved for the purposes of a park and recreation ground.

ISLAND.

The re-leasing of many Island lots, the final settlement with the Toronto Ferry Company, the application for water lots around the Island, the law suits with Simpson and Hanlan, and the Heber arbitration, all required many surveys and reports to the Solicitor's Department. The Hanlan suit resulted in the City's favor, thus establishing the position I have always taken, that all the roadways laid out by the City on the Island are public highways, and that, therefore, the rights of squatters should not be recognized.

BERKELEY STREET LEVEL CROSSING.

This matter occupied a good deal of my time, as information had to be acquired dating back as far as the first grants from the Crown in this locality, and with regard to the grants and contracts between the City and Grand Trunk Railway at the time the Esplanade was built. I personally examined all the old plans in the Crown Lands Department, and read over many reports and descriptions relating to the patents and other transfers of the property in this locality. In this connection, surveys made by myself some 15 or 20 years ago were of great service, in order that the various conditions under which the property has been held might be clearly placed before the arbitrator.

DUNDAS STREET BRIDGES ARBITRATION.

The six cases which were tried together before Judge Morson, namely, Mrs. Mallon, John Mallon, Mallon & Woods, the R. C. Episcopal Corporation, Foley and Daley, have been completed, and the last case, namely, Wm. Leak, is well under way, so that in a short time we may expect the finding in them all and the final settlement of this matter. The number of exhibits in the first cases in the shape of plans, etc., was so large that the counsel for the City, Mr. J. B. Clarke, Q.C., required my regular attendance at all the sittings of the Court, and also during the argument. For the City's case, I had a very large number of plans and other information to prepare, and evidence to get up, in order to meet the various claims set up by these parties. The experience gained in these cases will largely reduce the amount of work necessary in the Leak case.

### STREET NAMING.

The complete list of the proposed changes, after many revisions and corrections, was finally adopted by the Council, and an appointment has been made with the County Judge to hear any appeals in connection therewith, in order that his sanction may be obtained before the final passing of the By-law.

### DON IMPROVEMENT.

My principal work in connection with the Don Improvement was the collection of information and the making of some plans prior to the final adjustment of this somewhat intricate matter.

### CITY PLAN.

The compiling and plotting of all the plans in the Registry Office and Land Titles Office is now finished, and I am now revising and correcting all the sheets, so that the complete plan may be as perfect and as up to date as possible; in the meantime, copies of the sheets have been prepared for the use of the Registry Office, Assessment and other Departments. As soon as these corrections have been completed, I would advise strongly that an instrumental survey should be undertaken in order that this plan may meet the requirements of all the Departments in the City Hall, and be such a City plan as is continually kept up to date in Montreal, and all the large cities in the United States.

Yours faithfully,

VILLIERS SANKEY,

*City Surveyor.*

# REPORT OF STREET COMMISSIONER.

TORONTO, December 31st, 1895.

E. H. KEATING, ESQ.,
*City Engineer.*

DEAR SIR,—I beg to submit herewith the following report of work performed by this branch of the Works Department during the year 1895:

SIDEWALKS.

Compared with former years, the mileage of sidewalks laid was not very extensive, amounting only to 14.799 miles, as against 18.031 last year, and 57.788 in 1890. This comparatively small showing is accounted for by, firstly, the strong effort the Department has made to make the present sidewalks last longer instead of recommending new ones, the idea being to add as little as possible to the already burdensome taxes: secondly, by the determined stand taken by many property owners in opposition to the recommendations for the renewal of the walks fronting their holdings.

At the beginning of the season a list was prepared of such sidewalks only as were absolutely worn out; the majority of these were ultimately constructed. The balance, however, representing a considerable mileage, were successfully opposed by the interested parties when they came before the Court of Revision for ratification. No doubt these gentlemen were acting conscientiously from a personal standpoint, but in view of the regularity with which the City is mulcted in damages for accidents caused by defective sidewalks, their action cannot be considered other than the reverse of public spirited. However, it has been our endeavor, as far as possible, to avert disaster to the public in this connection by keeping constant supervision over these sidewalks in the matter of repairs. Some idea of the thoroughly rotten condition many of them are now in may be had from this fact, namely, to make them at all safe we have been compelled in some instances to fill in the gaps with sods, there being no possible means of putting in planks securely.

There is another important consideration in connection with the class of walks just referred to, and that is the exemption of two years conferred in such cases by the Local Improvement Statute, during which period a renewal of the recommendation is not allowable. Representations of the position this provision of the Statute places us in have been made to the City Solicitor, and it remains for him to seek relief from the Legislature from the burden. Certainly, if relief is not afforded the City in some shape or other, it will be absolutely necessary for its own protection to remove such sidewalks entirely, power which, it is understood, the Corporation now has.

The total number of wooden sidewalks laid was 124, of the following widths, namely :

| | | |
|---|---|---|
| 4 ft | 1.870 | miles. |
| 5½ ft | 2.788 | " |
| 6 ft | 9.691 | " |
| 8 ft | .386 | " |
| 10 ft | .064 | " |
| Total | 14.799 | " |

The quantity of lumber consumed in the construction of the above was 1,219,307 feet B.M., together with 29,175 lbs. of nails.

Our sidewalk work was delayed somewhat at the beginning of the season for the reason that, by the advice of the City Solicitor, each recommendation was submitted to the Court of Revision, thus affording the parties interested an opportunity of protesting against the walks being laid, or securing whatever changes they might deem desirable. This course was adopted in lieu of our former method of notifying owners of sidewalks proposed to be laid opposite their respective properties by advertising same in the public papers.

Owing to the fact that so many recommendations for new walks were set aside by the Court of Revision on receipt of petitions in opposition, the ordinary sidewalk repairs have been very much increased, entailing a considerable increase in the expenditure on this account.

### LAKE SHORE ROAD SIDEWALK.

For several seasons past High Park and the beach south of the Lake Shore Road have been growing in public favor as resorts for health and amusement. Heretofore there has been one drawback, namely, the lack of a proper sidewalk. Early in the season the

matter was brought up for discussion, ending in the sum of $950 being voted with the annual estimates for a 6-ft. wide wood sidewalk extending westerly from the railway crossing to Howard Park entrance, on the south side of Lake Shore Road, including a number of benches intended for seats at various points on the beach. These works were duly carried out, together with a new kerb, which serves the double purpose of supporting the walk and defining the roadway. The amount expended on the above was $1,132.18, exceeding the estimate by $182.18.

It is needless to say that the public highly appreciate this very necessary improvement. There is only one thing remaining to make it complete, and that is to extend the walk westerly to the City limit.

### CHURCH STREET SIDEWALK.

As a further experiment in the matter of brick sidewalks, the old wooden walk on the west side of Church Street, extending from Gould to Gerrard Street, opposite the Normal School, has been replaced with one composed of common stock bricks set on a foundation of cement mortar, with a kerb formed of 2-inch plank. A few vitrified bricks have been inserted here and there for the purpose of ascertaining their wearing qualities.

It is of the same width as the plank walk replaced, viz., six feet. The cost of construction per superficial yard was 89 cents, which is equivalent to a little over 59 cents per lineal foot. It may be stated in this connection that the cost is approximately double that of the ordinary plank walk of the same width. There are many advantages possessed by brick sidewalks over those constructed of wood, not the least of which is their wearing qualities.

It may be mentioned that the brick walk laid last year on south side of Gerrard Street opposite the Girls' Home has given every satisfaction. Doubtless, at no late date in the future, this class of sidewalk will win its way into popular favor.

### SIDEWALK EXTENSIONS, ETC.

The sum of $831.57 has been paid to the City Treasurer on the above account. The total of the sums paid on behalf of miscellaneous account was $289.39.

PICK UP SWEEPER AND IRON CART

## ROADWAY REPAIRS.

The various classes of roadway, comprising cedar block, cobble stone sett, macadam and general road repairs, have received regular and careful supervision. Many of the cedar pavements are in a deplorably dilapidated condition, being practically beyond repair. No effort on our part has been spared to safeguard the City in the matter of repairs where such were at all practicable; but in the case of a large number of these pavements, any attempt to put them in even decent shape is futile; nothing short of reconstructing them throughout will meet the case. As the same determined opposition on the part of property owners is manifested equally against the renewal of many of these worn-out pavements, as in the case of sidewalks, the remarks under the heading of sidewalks, referring to the attitude of said owners, is applicable.

It is only fair that credit should be given to those parties who, since the issue of our last Annual Report, have replaced the old pavements then existing with permanent pavements. May their action in this regard prove more and more contagious.

In the matter of macadam and stone sett roadways, the work, with the exception of the intersection of Yonge and Wellington Sts., noted elsewhere, has been mainly confined to repairing.

Unimproved roads, of which there are still a considerable number, have received attention as circumstances called for. Charges incurred under this branch of roadway work are entered against general road repairs account.

## KING STREET PAVEMENT.

This relates to a new piece constructed on the south side of the tracks immediately west of the King Street subway, commencing at a point about 367 feet west of the west pier of the subway, and extending about the same number of feet still further west, having a width of 14 feet. For some time past the tamarac blocks, formerly laid on that section of King Street, have been very much out of repair, and, on deciding to repave it, we thought a good opportunity was afforded of testing the wearing qualities of various kinds of hardwood blocks. With this in view, we obtained blocks measuring 4 x 7 in. of the following: hemlock, beech, maple, soft elm, rock elm, white pine and Norway pine, all of which were used in the reconstruction of this piece of pavement. The result will be carefully noted.

### ST. PATRICK STREET BRICK PAVEMENT.

It has long been a debatable question what the wearing qualities are of a pavement composed of bricks laid upon a sand foundation. By the action of the Council in appropriating the sum of $500 to defray the cost of a section of pavement constructed on the above lines, the question as to whether or not such is suitable for residential streets will be set at rest. The place chosen was on St. Patrick Street, opposite the Ryerson Public School, the area paved measuring 158 ft. x 24 ft. The bricks used are vitrified. One half (the eastern half) was grouted with neat Portland cement, the balance with pitch. The cost of the work amounted to about $1.30 per superficial yard.

### QUEEN'S PARK DRIVE.

Of late years the roadway leading from Queen Street around the new Parliament Buildings has been somewhat out of repair. The lack of proper road facilities has been more emphasized since the above mentioned buildings were erected in the Park, because of the greatly increased traffic to and from, both in summer and winter.

To remedy this state of affairs in some measure, the City Council, somewhat late in the season, appropriated the sum of $4,000 to be expended in improving the road from Queen Street extending northerly around the west crescent to Hoskin Avenue. Immediately our Department received the order we commenced work at the north end, and no effort was spared to complete it before the close of the season, but the frost setting in so early prevented us doing so. We propose to recommence the work immediately the weather will permit, and everything will be in good shape early in the spring. In this connection it is permissible to refer to the very great advantages derivable from the possession by the City of the steam road roller recently purchased. Without its aid it would be absolutely impossible to properly construct a roadway such as the one alluded to.

### BAY AND LAKE STREET ROADWAY.

Following on the lease of a portion of the ground on the Bay front known as the "Alternative Site" to the Cobban M'f'g. Co., on which they propose to erect a large factory, Council decided to construct a cedar and gravel roadway to connect same with Bay Street, at its intersection with the Esplanade. The amount voted for the

SWEEPER

work was $700, of which $657.62 has been expended, leaving a small balance to cover the cost of rolling with the steam roller and trimming the new road when the spring opens. It extends south on the extension of Bay Street, south from the Esplanade, thence westerly on Lake Street to the site mentioned. In addition to serving the Cobban people it will be of great convenience for vehicles, etc., driving to and from the wharves.

### DANFORTH AVENUE ROADWAY.

Of late we have been regularly in receipt of complaints of the defective condition of the roadway on Danforth Avenue, between Greenwood and Logan Avenue. For the purpose of gravelling and otherwise fixing up this section of roadway, the City Council voted the sum of $500. It may be well to mention that the whole of the piece of roadway described is in the City limit, while the property abutting thereon on the north side is in the County. As, however, the proposed improvement would be of equal service to all parties, an arrangement was entered into with the Township authorities by which they agreed to furnish the gravel, and the City to defray the cost of the labor to the amount of the appropriation, namely, $500. This arrangement was carried into effect with satisfaction to everyone concerned.

### RECONSTRUCTING.

Early in the summer the Toronto Railway Company commenced operations on a new line on Ossington Ave., between College and Dundas Sts.

In conjunction with the work, we found it necessary to cut down the boulevard and widen the roadway on either side. Pursuant to special instructions from Council, we repaved and rekerbed the roadway on both sides of the tracks for the entire distance. The total area repaved was 4,498 superficial yards, at a cost per yard of 73 cents.

### STONE AND WOOD CROSSINGS, AND KERBING.

The expenditure under these headings has been almost wholly for repairs and maintenance. In the matter of wood kerbing, we have constructed short stretches here and there as occasion called for. The many crossings throughout the City are, generally speaking, in a creditable condition.

## NEW STABLES.

It is exceedingly gratifying to be in a position to record that since the issue of our last Annual Report, the new stables required in the west end have become an accomplished fact. The necessity of improved accommodation for the large number of valuable horses and plant owned by the City in the western section has long been a crying one, both from a humanitarian standpoint and that of the City's own interest. In the buildings now practically completed, there is accommodation for sixty horses. The design is not elaborate, but it may safely be said that in the matter of solid construction, convenience, ventilation, sanitation and other desiderata in a structure of this character, these stables are not surpassed by those of any corporation on the continent. The upstairs portion, or loft, is used entirely for storing feed, which is served to the animals from overhead, a matter of very great importance. This part also contains provision for storing away harness, also the harness repair room, and compartment for feed boiler, etc. The floor is laid with concrete, which, with an up-to-date system of ventilation, will keep the stables clean and sweet.

## SCAVENGERING.

This service being entirely of a routine character, has no features calling for special mention. It has always been our endeavor to perfect a system at once efficient and economical. That our efforts have not been unsuccessful is evidenced by the fact that very few complaints are received the year round in connection with the service. From the commencement of our control of the scavengering, we recognized the close relationship this service holds towards the health and welfare of the community, and we have striven to prevent, as far as lay in our power, the ill effects which follow as a natural consequence whenever the scavengering work is inefficiently performed. When a complaint is received, a thorough investigation is at once made, and to the credit of the men who do the collecting, it must be said that in nearly every case the blame is found to lie at the door of householders themselves.

Covering the year, there were 113,924 loads of refuse collected, of which 34,588 loads were garbage; also 2,359 dead cats, and 781 dead dogs. Of the material removed, all that was suitable was utilized for filling in purposes. The portion collected in the section

ELEVATION WESTERN STABLE—STREET COMMISSIONER'S DEPARTMENT.

bounded by Carlton and College Sts. on the north, and Sherbourne and Bathurst Sts. on the east and west respectively, was placed on the "Alternative Site," including Lake St., in accordance with the terms of the agreement made between the City and the railway companies. The material from the eastern section of the City has been deposited at Cherry St.; that collected in the north has been used chiefly in forming roadways in the Rosedale ravine, whilst the stuff from the extreme west has been dumped at the Arthur St. bridges. All the garbage, together with the dead animals removed, was consumed at the Crematories.

The carts, waggons, harness and other plant used in the service are all in good order.

## STREET CLEANING.

This most important branch of municipal work has received every attention. The total expenditure was $56,078.66, which, it must be mentioned, covers in addition to street cleaning (including the asphalt pavements which are cleaned by hand) the removal of snow and ice from the street intersections, roadways, bridges, etc. Before the work of street cleaning proper commenced, we spent close on $20,000 in the removal of snow, as above stated, including $7,000 in cleaning snow from sidewalks fronting vacant houses and lands. From this it will be seen that actual street cleaning cost only about $36,000, which, as mentioned above, covers the asphalt pavements. As these latter are cleaned by the orderly or hand system, there is a comparatively large slice of the appropriation required to cover the expenditure, namely, $9,000. If these allowances are made it will be seen that the net amount available for cleaning the balance of the streets, outside those paved with asphalt, is surprisingly small. It is, therefore, with pardonable pride that the Department adverts to the record it has established in the past and fully maintained during the year now expiring, in regard to the standard of cleanliness of the streets, and the comparatively low expenditure in obtaining that result. We unhesitatingly affirm that the reputation of Toronto in this respect is unique, no city in the world showing the same proportions of excellence and expenditure.

Altogether we cleaned 16,036 lineal miles of streets, removing 49,286 loads of scrapings, sweepings, etc., each load averaging one cubic yard.

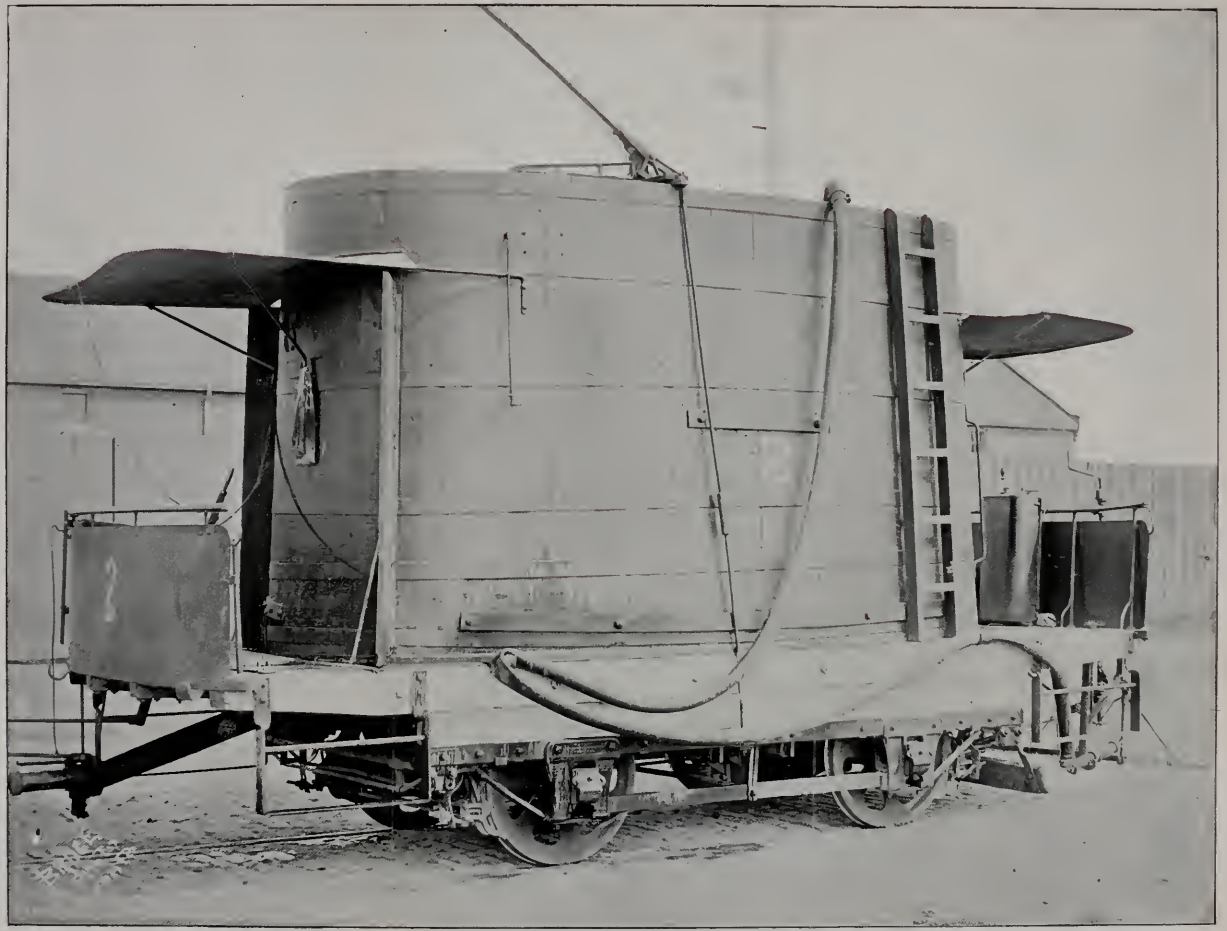
## SNOW CLEANING.

Last winter was an exceptional one, both in the severity of the frost and the depth of snow fall. In spite of these facts, however, the rate for cleaning sidewalks fronting vacant properties (work performed under By-law No. 2464 and amendment No. 2952) was lower than the preceding winter. For the last named the charge per foot frontage, each cleaning, was $\frac{5}{9}$ of a cent, whilst for last winter it was $\frac{2}{3}$ of a cent. The aggregate length of sidewalks cleaned was a little over 346 miles, being 50 miles in excess of the preceding winter. The total expenditure was $7,309.57. If the Legislature would sanction the reduction of the period, namely, 24 hours, to say 10 hours, which is to elapse after a snowfall before we can commence cleaning the sidewalks, the expense connected with this service could be materially lowered.

It will be noticed that a reference is made above to an item of $7,000 spent out of the street cleaning appropriation for removing snow from walks fronting private properties. In respect of the facts connected with this item the Department considers it has a substantial grievance. When the snow cleaning By-law was passed it was distinctly understood and stated that the expense was to be borne by the City pending the collection of the charges from the owners whose properties had been cleaned. If it was intended that disbursements were to be met out of the street cleaning fund, it was surely further intended that such disbursements should be repaid to the credit of said fund whenever the charges were collected. This, however, has not been the case. The following statement shows the amounts spent each year on the work of snow cleaning since it was placed under our control, of which not one dollar has been refunded as far as is known:

| | | |
|---|---|---|
| Winter of | 1890-91 | $1,264 47 |
| " | 1891-92 | 3,516 45 |
| " | 1892-93 | 7,761 60 |
| " | 1893-94 | 8,334 14 |
| " | 1894-95 | 7,309 57 |
| | Total | $28,186 23 |

A contemplation of the figures representing the total of the sums permanently withdrawn from the funds allotted us by Council for such an important service as the cleaning of streets, justifies, we



TROLLEY SPRINKLER

submit, the remark made above, namely, that in this we have a very substantial grievance. It is earnestly to be hoped that Council will take action in the direction of ordering the creation of a special fund to meet the current expenses of this branch of work, or else instruct the City Treasurer to repay all monies thus withdrawn from our appropriation.

### STREET WATERING.

Like the scavengering, this service partakes very much of a routine character. The most important item we have to record is the second season's operation of the watering of the track portions by trolley. The success of this system as demonstrated last year is now complete. Complaints from merchants and others doing business on the main streets, which formerly were both urgent and numerous, have been noticeable by their infrequency.

The Company has had the three tanks of last year in operation. The aggregate number of miles covered by them was 14,189. During the period, the City's water supply was cut off owing to the rising of the conduit. These tanks proved especially serviceable in the distribution of water to householders, by hauling it swiftly and in large quantities from the source of supply at West Toronto Junction to points in the City where the contents were transferred to carts and waggons. It is unnecessary to mention that the street sprinkling was discontinued during this period, namely, from Sept. 7th to Oct. 21st, otherwise the mileage they traversed would have shewn a considerable increase. The consumption of water by these tanks on the street sprinkling was 18,766,300 gallons, whilst that of the watering carts and waggons totalled 41,823,500 gallons, representing 88,079 loads, making a grand total of 60,589,800 gallons of water used in the street sprinkling service.

### DISTRIBUTION OF WATER TO HOUSEHOLDERS.

As stated above, the period during which the supply of pure water was cut off from the City owing to an accident to the conduit, was from Sept. 7th to Oct. 21st, inclusive (44 days). The gravity of the situation called for very urgent action, and after a brief consultation with the Acting Mayor and the City Engineer, the Department promptly stepped in and inaugurated a system of house to house supply of pure water procured from the Municipalities of East Toronto, North Toronto and West Toronto Junction; the distribution

being accomplished by means of the watering waggons. As might be expected, there was considerable difficulty met with at the commencement in covering the entire City, owing to the long distances the water had to be brought, and the immense area to be served, together with the inadequate number of waggons at our disposal. The initial difficulties were, however, largely disposed of in a short time, and the system henceforward worked almost perfectly. In addition to our own plant, we secured twelve large watering waggons and four tubs from the Corporation of Hamilton, also a number of waggons and drays were hired from private parties. A word here, expressive of gratitude, is due the authorities of the City of Hamilton for the prompt response we received to our application for the loan of their watering plant. Within an hour from the time the application was made, the waggons were called off their beats, and arrangements made to ship them to this City, where they remained until the regular supply of water was again put in operation.

The following quantities of water were supplied by the aforementioned municipalities, respectively :

| | |
|---|---|
| East Toronto | 314,500 gallons. |
| North Toronto | 451,250 " |
| West Toronto Junction | 4,091,400 " |
| Total | 4,857,150 " |

To bring in the water from the two first named sources there was no method available except by hauling direct with the waggons.

This involved a great deal of delay, besides being very burdensome on the horses. But in the case of West Toronto Junction, this trouble was obviated largely by the use of the trolley tanks.

The carts and waggons were each allotted a beat, and made on the average three trips daily, Sundays included, each driver being supplied with a horn to warn the people of the presence of the waggon. The daily distribution equalled one-half gallon per head of the population.

## STREET OPENING PERMITS.

Permits to the number of 28 have been issued to builders and others requiring to take up sections of the sidewalks. The total amount received on deposit from this source, as a guarantee that the walks would be properly restored, was $250, of which $240 was refunded.

## CULVERTS AND GULLIES.

This important branch of work has received every attention. As usual, the average number of cleanings each has had is nine, bringing the total to between fifty and sixty thousand cleanings.

## THE "PRINCE'S WALK."

Early in the season we were directed, by the Works Committee, to erect a post and iron pipe fence on the northern boundary of the above promenade, extending from Bathurst to Spadina Ave.

The posts are turned after a neat pattern; the piping is of $1\frac{1}{4}$ inches, the whole being painted in suitable colors. The erection of this fence will be the means of preserving this piece of property for the enjoyment of residents and visitors in that locality, where something of that kind is very much needed. Heretofore it has been a favorite galloping ground for horsemen. The sum voted for the work was $300, the cost being $288.41.

## POUND FEES.

The following amounts have been collected in fees at the respective City pounds:

| | |
|---|---|
| Northern Pound | $100 50 |
| Western " | 6 00 |
| Eastern " | 72 30 |
| Total | $178 80 |

## COMPLAINTS.

Complaints in regard to defective sidewalks, roadways, culverts, etc., etc., to the number of 1,801 were received, in each instance prompt attention being given.

Respectfully submitted,

JOHN JONES,
*Street Commissioner.*

## STATEMENT OF WOOD SIDEWALKS CONSTRUCTED DURING YEAR 1895.

### District No. 1.

| Street. | Side. | From | To. | Width (feet). | Length (feet). | Lumber(B.M.) | Nails (lbs.) | Total Cost. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | $ c. |
| Cummings | N. | Bolton | DeGrassi | 4 | 207 | 2,208 | 60 | 42 95 |
| Cummings | S. | DeGrassi | Wardell | 4 | 309 | 3,296 | 100 | 64 87 |
| DeGrassi | E. | Queen | Gerrard | 5⅓ | 2,364 | 31,520 | 150 | 686 31 |
| Grant | E. | Queen | Clark | 4 | 299 | 3,190 | 75 | 59 72 |
| Munro | E. | Gerrard | Mountstephen | 5⅓ | 489 | 6,520 | 150 | 157 79 |
| *DeGrassi | W. | Queen | First | 5⅓ | 2,091 | 27,880 | 500 | 530 31 |
| First | S. | Bolton | DeGrassi | 6 | 202 | 3,392 | 75 | 61 83 |

### District No. 2.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Carlton | N. | Maple | Sumach | 6 | 292 | 4,944 | 100 | 83 18 |
| Carlton Av. | S. | Ontario | Point 333 ft. east | 5⅓ | 333 | 4,440 | 90 | 75 30 |
| Dale | N. | Glen | Maple | 4 | 764 | 8,374 | 170 | 143 03 |
| Front | N. | Parliament | Trinity | 6 | 599 | 9,952 | 220 | 169 97 |
| †Front | N. | Cherry | Point 296 ft. east | 6 | 203 | 3,248 | 80 | 56 27 |
| Glen | W. | Howard | The Bridge | 5⅓ | 417 | 5,560 | 85 | 95 32 |
| Ontario | E. | Queen | Sydenham | 6 | 440 | 7,136 | 170 | 120 14 |
| Parliament | E. | Wellesley | Howard | 6 | 1,211 | 1,966 | 430 | 326 84 |
| ‡Reid | S. | Sackville | Point 269 ft. east | 4 | 264 | 2,816 | 70 | 49 83 |
| Sherbourne | W. | King | Front | 6 | 269 | 4,496 | 100 | 76 84 |
| Sumach | W. | Carlton | Winchester | 6 | 468 | 7,952 | 180 | 132 00 |
| Tate | S. | Water | Beachell | 4 | 433 | 4,640 | 100 | 78 90 |
| Trefann | E. | Queen | 1st lane south of Sydenham. | 4 | 331 | 3,530 | 80 | 62 04 |
| Trefann | W. | Queen | Robert Pl | 4 | 298 | 3,179 | 70 | 51 24 |
| Wilton | N. | Ontario | Berkeley | 6 | 262 | 4,704 | 120 | 85 00 |
| Winchester | N. | Ontario | Rose | 6 | 293 | 5,024 | 100 | 85 73 |
| Wilton | S. | Berkeley | Parliament | 6 | 278 | 4,992 | 115 | 93 71 |
| Winchester | S. | Metcalf | Sackville | 6 | 372 | 6,688 | 130 | 111 86 |
| Queen | S. | Pt. 117 ft. east of Sumach. | River | 6 | 505 | 8,336 | 175 | 140 60 |
| Queen | S. | St. Paul | Sackville | 6 | 211 | 3,680 | 90 | 63 19 |
| River | E. | Queen | Wilton (N.S.) | 6 | 1,364 | 22,144 | 520 | 356 32 |
| Spruce | N. | Sackville | Gifford | 6 | 182 | 3,344 | 100 | 55 13 |
| §Sackville | E. | Queen | St. David | 6 | 788 | 12,880 | 310 | 216 49 |
| Berkeley | W. | Wilton | First lane north. | 6 | 124 | 2,032 | 50 | 31 65 |
| Carlton | N. | Pt. 50 ft. east of Ontario. | Parliament | 6 | 617 | 9,872 | 260 | 65 22 |
| Amelia | N. | Parliament | Sackville | 6 | 767 | 12,560 | 260 | 66 74 |

### District No. 3.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Church | W. | Gould | Shuter | 6 | 1,155 | 20,351 | 600 | 400 17 |
| Church | E. | Gloucester | Isabella | 6 | 310 | 5,600 | 150 | 99 62 |
| Duke | N. | Jarvis | George | 6 | 269 | 4,736 | 100 | 88 90 |
| Duchess | N. | Sherbourne | Walker's Lane | 6 | 124 | 1,984 | 50 | 36 05 |
| Duke | S. | Frederick | Sherbourne | 6 | 278 | 4,624 | 150 | 82 05 |
| Esplanade | N. | Scott | West Market | 6 | 1,008 | 16,656 | 500 | 318 59 |
| Gloucester | N. | Church | Point 150 ft. east | 6 | 150 | 2,400 | 50 | 41 01 |
| Gwynne | E. | Bloor | Bismarck | 4 | 332 | 3,616 | 100 | 67 58 |
| Hayden | S. | Yonge | Church | 4 | 939 | 10,016 | 250 | 188 18 |
| Richmond | N. | Victoria | Berti | 10 | 333 | 8,588 | 175 | 153 22 |

* Not laid in front of Mr. Woodrow's property, Nos. 38 and 40, 14½ feet.

† Laid only from Cherry Street easterly 203 feet.

‡ Laid only 264 feet easterly.

§ Not laid from St. David Street southerly, 60 feet.

WOODEN SIDEWALKS—*Continued.*

| Street. | Side. | From | To. | Width (feet). | Length (feet). | Lumber(B.M.) | Nails (lbs.) | Total Cost. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | $ c. |
| Victoria | W. | Gould | Gerrard | 6 | 570 | 9,168 | 250 | 194 72 |
| Wellesley | S. | Church | Yonge | 6 | 940 | 15,040 | 325 | 262 97 |
| Wilton | N. | Mutual | Jarvis | 6 | 239 | 3,824 | 100 | 72 41 |
| Wilton | N. | Church | First lane west. | 6 | 118 | 1,888 | 75 | 47 29 |
| Wilton | S. | Yonge | Jarvis | 6 | 1,319 | 21,888 | 600 | 369 70 |
| Adelaide | S. | Church | Francis | 6 | 471 | 7,536 | 250 | 129 36 |
| Charles | S. | Yonge | Kiely's Stables | 6 | 552 | 8,832 | 300 | 147 43 |
| George | W. | Queen | Point 193 ft. S. of Wilton. | 6 | 946 | 15,424 | 400 | 259 04 |
| George | E. | Queen | Wilton | 6 | 1,014 | 16,288 | 400 | 292 32 |
| *Lombard | S. | Jarvis | Church | 6 | 550 | 8,800 | 250 | 161 84 |
| Mutual | E. | Queen | Gerrard | 6 | 2,353 | 37,648 | 1,050 | 666 33 |
| Mutual | W. | Shuter | Gerrard | 6 | 1,728 | 28,112 | 800 | 481 89 |
| | | | DISTRICT No. 4. | | | | | |
| Scollard | N. | Yonge | Point 171 ft. west | 5⅓ | 171 | 2,280 | 55 | 37 93 |
| Albert | N. | Yonge | James | 8 | 342 | 7,296 | 50 | 130 42 |
| New | S. | Davenport | West end | 4 | 248 | 3,008 | 100 | 55 64 |
| †Temperance | S. | Yonge | Bay | 8 | 469 | 10,006 | 200 | 171 50 |
| Walton | S. | Teraulay | Yonge | 6 | 721 | 11,536 | 300 | 201 11 |
| Simcoe | E. | Queen | Caer Howell | 6 | 2,104 | 32,224 | 700 | 514 62 |
| Surrey Pl | E. | Grosvenor | St. Albans | 6 | 649 | 10,384 | 250 | 167 20 |
| St. Thomas | E. | Czar | Bloor | 6 | 465 | 7,440 | 170 | 121 76 |
| St. Thomas | W. | Sutton | Bloor | 6 | 222 | 3,552 | 80 | 57 71 |
| ‡Adelaide | B. | York | Simcoe | 8 | 1,224 | 26,182 | 600 | 419 71 |
| Cumberland | N. | Yonge | Bellair | 4 | 999 | 10,656 | 300 | 177 24 |
| Edward | S. | Teraulay | Centre | 6 | 780 | 12,480 | 300 | 216 18 |
| Grosvenor | S. | Surrey | The Park | 6 | 297 | 4,752 | 100 | 75 34 |
| | | | DISTRICT No. 5. | | | | | |
| Balsam | S. | Spadina | Charlotte | 4 | 302 | 3,270 | 100 | 60 19 |
| Grange | S. | McCaul | John | 6 | 339 | 5,432 | 100 | 100 44 |
| Huron | W. | Baldwin | Pt. 216 ft. south. | 6 | 216 | 3,552 | 75 | 64 47 |
| King | N. | John | Widmer | 6 | 338 | 5,408 | 125 | 99 79 |
| §Richmond | S. | John | Widmer | 6 | 278 | 4,528 | 100 | 82 34 |
| Renfrew | S. | McCaul | St. Patrick | 4 | 112 | 1,195 | 50 | 22 56 |
| Stephanie | N. | John | Beverley | 4 | 227 | 2,422 | 100 | 47 57 |
| Nelson | S. | Point 80 ft. east of John. | Simcoe | 6 | 831 | 13,496 | 300 | 244 30 |
| Richmond | N. | John | Duncan | 6 | 414 | 6,624 | 150 | 121 76 |
| Spadina | W. | Queen | Adelaide | 6 | 703 | 11,344 | 225 | 199 93 |
| King | N. | Peter | Widmer | 6 | 325 | 5,200 | 125 | 90 95 |
| Anderson | B. | Simcoe | East end | 4 | 285 | 3,040 | 85 | 50 12 |
| Baldwin | N. | Spadina | Huron | 6 | 474 | 7,584 | 150 | 178 13 |
| Caer Howell | S. | Simcoe | The Avenue | 6 | 173 | 2,768 | 75 | 43 98 |
| Front | N. | Spadina | Peter | 6 | 716 | 11,600 | 250 | 206 57 |
| Huron | E. | St. Patrick | Grange | 6 | 334 | 5,416 | 100 | 97 39 |
| ¶McCaul | E. | Pt. 91½ ft. north of Queen. | New Richmond Church. | 6 | 636 | 10,176 | 200 | 184 33 |
| McCaul | E. | Pt. 60 ft. north of Anderson. | South side of No. 153. | 6 | 330 | 5,280 | 100 | 94 28 |

* Not laid from Church Street, 79 feet.
† Except 63 feet at Nos. 17 and 19, and 50 feet at Nos. 35 and 37.
‡ Except 61 feet from Simcoe Street easterly, on south side.
§ Except 56 feet opposite the Liederkranz Club.
‖ Not laid from Grange Avenue northerly, 13 feet.
¶ Not laid opposite Renfrew Place, 16 feet.

WOODEN SIDEWALKS—*Continued.*

DISTRICT No. 6.

| Street. | Side. | From | To. | Width (feet). | Length (feet). | Lumber(B.M.) | Nails (lbs.) | Total Cost. $ c. |
|---|---|---|---|---|---|---|---|---|
| Bellevue Pl.... | N.. | Bellevue..... | West end..... | 6 | 465 | 7,440 | 175 | 176 78 |
| *Bathurst ..... | W.. | King..... | The Bridge ..... | 6 | 1,106 | 18,296 | 400 | 380 25 |
| Bathurst ..... | E.. | Queen..... | Woodsley ..... | 6 | 264 | 4,224 | 100 | 77 26 |
| Broadway Pl .. | S... | Spadina..... | Pt. 160 ft. west . | 4 | 160 | 1,707 | 75 | 36 56 |
| †Brunswick ... | B.. | College..... | Ulster..... | 6 | 1,100 | 17,600 | 400 | 323 25 |
| Draper..... | B.. | Front ..... | Wellington ..... | 4 | 948 | 10,112 | 325 | 202 77 |
| Esther ..... | W.. | Woolsley..... | Queen. ..... | 6 | 263 | 4,208 | 100 | 79 63 |
| ‡Front ..... | N.. | Bathurst ..... | Spadina ..... | 6 | 2,050 | 33,088 | 700 | 608 69 |
| Nassau..... | N.. | Augusta..... | Spadina ..... | 6 | 770 | 12,320 | 275 | 253 48 |
| Palmerston.... | E.. | Arthur..... | Robinson..... | 6 | 1,274 | 20,384 | 450 | 477 32 |
| St. Patrick .... | N.. | Bathurst ..... | Carlyle..... | 6 | 298 | 4,768 | 100 | 108 92 |
| Wellington .... | S... | Bathurst ..... | Tecumseth ..... | 6 | 665 | 10,640 | 200 | 281 16 |
| Niagara ..... | S... | Bathurst ..... | Portland ..... | 6 | 660 | 10,560 | 225 | 188 17 |
| St. Andrew.... | N.. | Kensington..... | Spadina ..... | 6 | 410 | 6,566 | 175 | 154 91 |
| Wellington..... | S... | Portland ..... | Spadina ..... | 6 | 1,307 | 20,912 | 450 | 415 25 |

DISTRICT No 7.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Arthur ..... | N.. | Manning..... | Euclid ..... | 6 | 281 | 4,496 | 100 | 81 63 |
| Defoe ..... | N.. | Niagara ..... | Pt. 147 ft. west.. | 5⅓ | 147 | 1,960 | 50 | 39 34 |
| Dundas ..... | E.. | Pt. 44 ft. north of Queen. | Pt. 60 ft. north of Rebecca. | 6 | 285 | 4,560 | 125 | 87 83 |
| Defoe ..... | S .. | Tecumseth ..... | Niagara ..... | 5⅓ | 745 | 10,051 | 250 | 247 02 |
| Ossington ..... | W.. | Harrison ..... | College..... | 5⅓ | 1,241 | 16,547 | 400 | 339 19 |
| Essex ..... | S .. | Christie ..... | West end..... | 4 | 645 | 6,880 | 200 | 136 90 |
| Grove..... | E.. | Dundas ..... | Foxley ..... | 6 | 680 | 10,880 | 200 | 248 47 |
| Grove..... | W.. | Dundas ..... | Foxley ..... | 6 | 730 | 11,680 | 300 | 223 58 |
| Manning ..... | W.. | Queen..... | Robinson..... | 6 | 556 | 8,896 | 250 | 175 40 |
| Pawnee ..... | E.. | The Lake ..... | North end..... | 4 | 619 | 6,909 | 200 | 129 31 |
| Robinson..... | S .. | Bellwoods..... | Manning ..... | 5⅓ | 470 | 6,266 | 175 | 209 43 |
| Wellington ... | N.. | Pt. 50 ft. east of Niagara. | Tecumseth ..... | 4 | 274 | 2,922 | 100 | 60 90 |

DISTRICT No 8.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Argyle ..... | S .. | Northcote ..... | Gladstone ..... | 6 | 288 | 4,703 | 125 | 88 37 |
| §Bloor ..... | N.. | Westmoreland .. | Dovercourt ..... | 6 | 154 | 2,468 | 50 | 57 83 |
| Dufferin..... | E.. | College..... | Dundas ..... | 5⅓ | 1,054 | 14,055 | 300 | 259 93 |
| Dundas ..... | N.. | Rusholme ..... | Pt. 505 ft. west.. | 6 | 505 | 8,080 | 200 | 153 29 |
| Lisgar ..... | W.. | Argyle..... | Afton ..... | 5⅓ | 466 | 6,344 | 125 | 110 53 |
| **N. Lisgar.... | W.. | Dundas ..... | Afton ..... | 5⅓ | 867 | 11,701 | 250 | 249 11 |
| ††St. Clarens.. | W.. | Dundas ..... | South end..... | 5⅓ | 1,103 | 14,806 | 300 | 359 68 |
| ‡‡Spencer ..... | E.. | King..... | Pt. 804 ft. south. | 6 | 804 | 13,596 | 300 | 242 47 |
| Spencer ..... | W.. | King..... | Pt. 894 ft. south. | 6 | 894 | 14,880 | 350 | 260 51 |
| Dovercourt.... | E.. | College..... | Bloor ..... | 5⅓ | 2,760 | 36,840 | 900 | 657 19 |

DISTRICT No. 9.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| N. Lansdowne. | E.. | Dundas ..... | Shirley..... | 4 | 819 | 8,736 | 300 | 228 02 |

* Not laid 12 feet in front of Rogers' property between railway tracks.
† Laid only on east side from point 120 feet north of College Street to Ulster Street.
‡ Not laid 11 feet in front of Mr. McFarren's property.
§ Not laid in front of Dr. Noble's property, 20 feet, and A. Bollard's property, 64 feet.
** Laid to kerb from Afton to McKenzie, balance, viz.: to Dundas, laid on old line.
†† Not laid at south end a distance of 44 feet.
‡‡ Not laid in front of Mr. Chandler's property, 120 feet.

# WATER WORKS REPORT FOR THE YEAR ENDING 31st JANUARY, 1896.

CITY ENGINEER'S OFFICE,
Toronto, 5th March, 1896.

## FINANCIAL.

The total expenditure for 1895 by that portion of the Water Works Department which comes under the supervision of the City Engineer, which is exclusive of the interest and Sinking Fund on the Debenture Debt and of the cost of collecting the rates, amounted to $236,641.04, divided as follows:

| | |
|---|---|
| *Maintenance account | $144,515 40 |
| Construction account | 44,119 27 |
| Renewals | 48,006 37 |

Details of these expenditures are given in Schedule No. 1.

The expenditure on account of the Revenue Collection Branch of the Department, which is under the control of the City Treasurer, amounted to $25,093.03.

| | | |
|---|---|---|
| The revenue, as reported by City Treasurer | | $445,674 95 |
| Ordinary working expenses of both branches of the Department | $148,908 06 | |
| Interest and Sinking Fund on the Debenture Debt | 224,732 00 | |
| Expenditure on renewal and repair account | 48,006 37 | |
| Revenue over the yearly charges | 24,028 52 | |
| | | $445,674 95 |

## DISTRIBUTION.

There have been laid during the year 7,441.25 feet of mains, divided as follows:

218 feet of 30-inch main.
1,019.5 " 12 " "
6,203.75 " 6 " "

The following valves and hydrants have been erected:

| | |
|---|---|
| 1 | 30-inch valve. |
| 7 | 12 " valves. |
| 32 | 6 " " |
| 43 | hydrants. |

* Including coal carried over from 1894, $20,700.37.

The number of feet of mains, etc., taken up or abandoned is 2,768 feet of old 6-inch cement mains, one 6-inch valve, one 3-inch valve and six hydrants, leaving a total of 248.336 miles of mains in use to date, 2,082 stop valves, 66 check valves, and 2,926 hydrants.

The number of services laid during the year was 357. The number of leaks on the mains were 108, equal to one leak to 2.3 miles of mains. The cost of repairing the same, exclusive of asphalt repairs, was about $5.26 per leak.

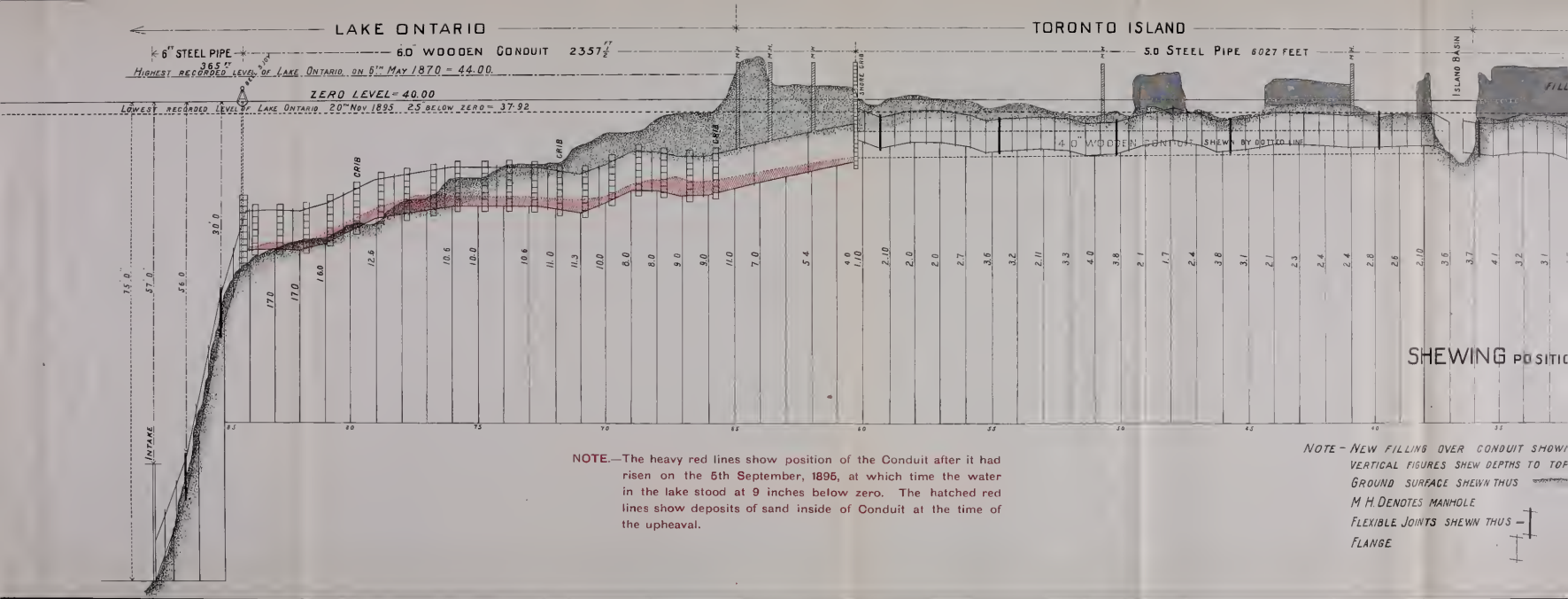
### HYDRANTS.

There are now four different patterns of hydrants in use, three of them being similar in the valve motion, the difference in two of them being in the size of the valve, while the third has a third nozzle adapted for the use of steam fire engines. The fourth is a 4-way hydrant of the Chapman Valve Manufacturing Co.'s make.

### ACCIDENT TO CONDUIT.

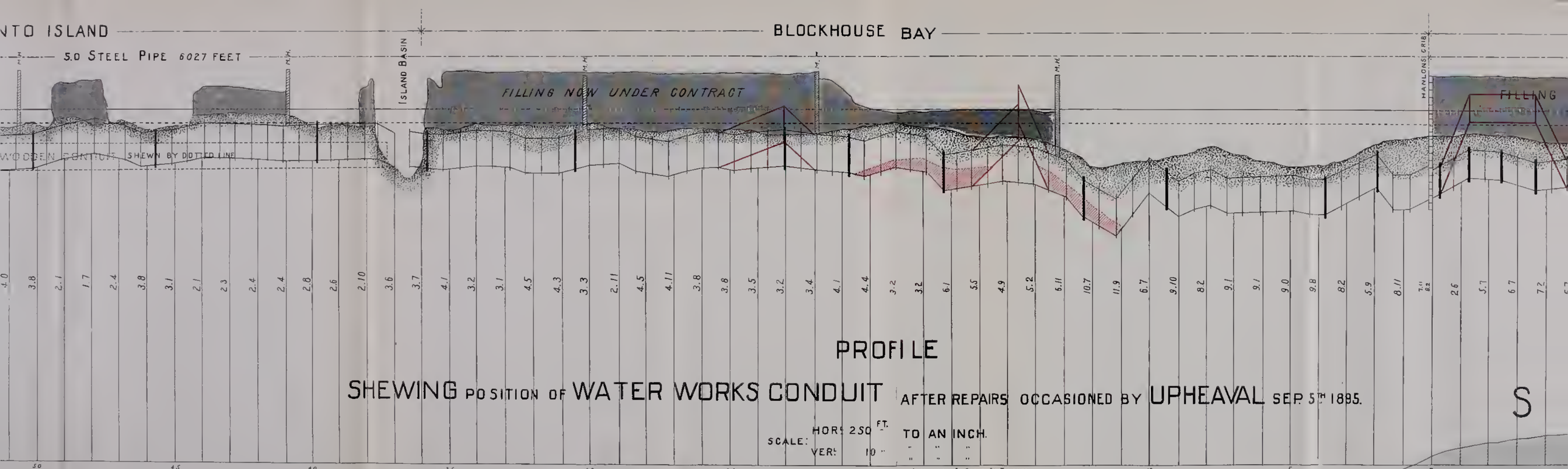
At eight o'clock in the morning of the 5th of September the conduit supplying water to the City rose in three places, as follows: 230 feet of the 4-ft. conduit rose immediately to the north of Hanlan's Crib, exposing three flexible joints. Half of this length, or about 115 feet, then settled down, leaving the remaining portion above water. This portion of the pipe had previously risen in the accident which happened on Christmas Day, 1892. The second upheaval was immediately to the south of Manhole No. 1 in Blockhouse Bay. At this point the pipe rose and broke at the flange joint, leaving the northerly portion of the pipe entirely out of water. The southern portion fell back, leaving the upper part of the broken flange projecting a short distance above the surface. This portion of the pipe was not disturbed in the accident of 1892. The next and last portion of the pipe affected was that immediately to the south of Manhole No. 2 in Blockhouse Bay, where the pipe rose, exposing one of the flexible joints. This portion of the pipe had been previously disturbed by the accident of 1892.

The effect of this accident was to immediately cut off the entire water supply from Lake Ontario, leaving the City dependent upon the water in Rosehill Reservoir, which, fortunately, at the time happened to be full. As this Reservoir does not hold quite two days' supply, it became necessary to make provision at once for maintain-


LAKE ONTARIO
TORONTO ISLAND
6" STEEL PIPE
6.0" WOODEN CONDUIT 2357½'
5.0 STEEL PIPE 6027 FEET
365'
HIGHEST RECORDED LEVEL OF LAKE ONTARIO, ON 6TH MAY 1870 = 44.00.
ZERO LEVEL = 40.00
LOWEST RECORDED LEVEL OF LAKE ONTARIO 20TH NOV 1895 2.5 BELOW ZERO = 37.92
INTAKE
CRIB
SHORE CRIB
ISLAND BASIN
4.0 WOODEN CONDUIT SHEWN BY DOTTED LINE
SHEWING POSITIO

NOTE.—The heavy red lines show position of the Conduit after it had risen on the 5th September, 1895, at which time the water in the lake stood at 9 inches below zero. The hatched red lines show deposits of sand inside of Conduit at the time of the upheaval.

NOTE – NEW FILLING OVER CONDUIT SHOWN
VERTICAL FIGURES SHEW DEPTHS TO TOP
GROUND SURFACE SHEWN THUS
M H DENOTES MANHOLE
FLEXIBLE JOINTS SHEWN THUS –
FLANGE




# PROFILE

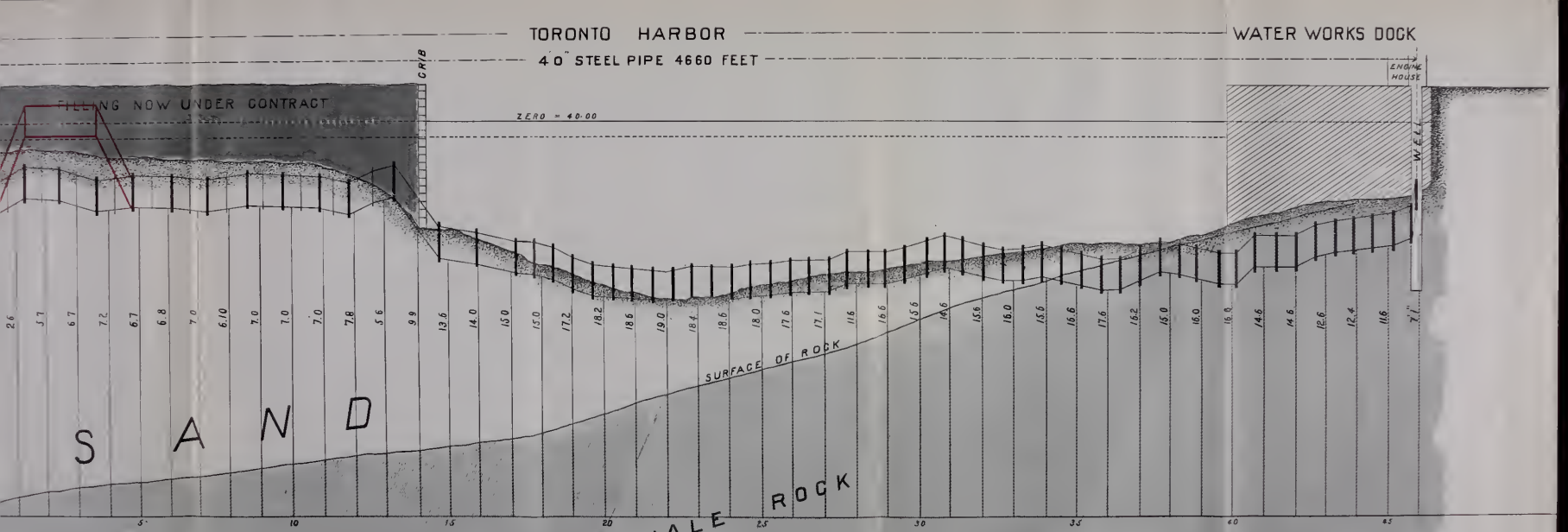
## SHEWING POSITION OF WATER WORKS CONDUIT AFTER REPAIRS OCCASIONED BY UPHEAVAL SEP. 5TH 1895.

SCALE: HORS 250 FT. TO AN INCH.
VERT 10 " " " "

ALEXANDER & CABLE CO TORONTO

NOTE - NEW FILLING OVER CONDUIT SHOWN THUS
VERTICAL FIGURES SHEW DEPTHS TO TOP OF PIPE BELOW ZERO LEVEL LAKE ONTARIO
GROUND SURFACE SHEWN THUS
M. H. DENOTES MANHOLE
FLEXIBLE JOINTS SHEWN THUS —
FLANGE " " "

E. H. Keating
City Surv




E. Keating
City Engr. 31st March 1896.

ing the supply by drawing the water from Blockhouse Bay, and this was done without loss of time by disconnecting one of the exposed flexible joints on the 48-inch pipe to the north of Hanlan's Crib and lowering it into the Bay. This was accomplished by 8 p.m. on the same day that the accident happened, and the pumps at the Main Pumping Station were started at 8.30 p.m. The result was that an abundant supply of Bay water was at once obtained, and the supply from this source was continued until the afternoon of October 17, when the final connection was made and the water supply from Lake Ontario was restored to the City.

The accident was caused by a combination of circumstances, any one of which would not have been sufficient in itself to produce the upheaval of the conduit. These circumstances were as follows:

1. Enormous accumulations of sand in the conduit.

2. The unprecedented low state of the water in Lake Ontario.

3. An old water-logged plank, 3 inches in thickness by 16 inches in width and 8 feet 6 inches in length, having become embedded in the sand and standing vertically in the conduit at the Lake Shore manhole, presenting its whole width to the flow of water in the conduit, which, together with the sand in the pipe, reduced its capacity about 40 per cent.

The effect of these obstructions, combined with the lowness of the Lake and the high and irregular gradients at which the conduit had been laid, was more than the system could stand, and my belief is that the conduit rose to the surface before any notice was received at the Main Pumping Station that anything was amiss, the only notice received at this station being the sudden and unexpected stoppage of the supply from the Lake.

### WORK NECESSITATED BY LOWNESS OF THE LAKE.

In addition to the work rendered necessary by this accident very great trouble was experienced by reason of the lowness of the water in Lake Ontario, which stood at 13½ inches below zero level on the day of the accident (Harbor Commissioner's gauge). There being every reason to fear that the Lake level would continue to fall still lower (which it did up to the 20th November, when it stood at *25

* This is the lowest level which has ever been recorded. At the end of the year the Lake level stood at 21⅛ inches below zero by the same gauge. The City gauge at Main Pumping Station always records a higher Lake level than the Harbor Commissioner's gauge. The difference has been as great as 8 inches. At the time of writing this report the difference is 3 inches.

inches below zero level by the Harbor Commissioner's gauge), it became necessary to devise some means by which the water supply to the City could be maintained, as the 5-ft. conduit lies at so high a level that it would not discharge all the water required to meet the ordinary daily demands of the citizens.

To overcome this difficulty it was finally decided to utilize, as far as practicable, the old 4-ft. wooden conduit, which had been abandoned some years ago, and which lay at a much lower level than the 5-ft. steel pipe across Toronto Island. In order to accomplish this the 4-ft. wooden conduit was connected with the Lake Shore Crib, a small receiving basin was constructed on the northern shore of the Island at a point 2,400 feet north of the Shore Crib, and both the 4-ft. wooden conduit and the 5-ft. steel conduit were opened and disconnected in this basin and made to discharge all the water that could be delivered by them into it, the supply to the City from this point being drawn entirely through the remaining portion of the 5-ft. steel conduit in the same manner as formerly.

Before the water was turned into the old wooden conduit it was thoroughly examined from the inside and found to be in sufficiently good condition for the purpose for which it was intended to be used. It was also thoroughly flushed out before the water was finally drawn through it for the City supply.

The effect of the construction of this basin and the utilization of the old wooden conduit was practically the same as if the lake had been raised two feet, while it also had the effect of preventing the influx of sand into the pumping wells, as well as into all that portion of the conduit to the north of the basin. There is, however, the serious risk of this sand accumulating in both the wooden and the steel conduits between the Island basin and the Shore Crib to an alarming extent, unless steps are immediately taken to substitute a new and tight 6-ft. steel conduit for the existing defective wooden one between the Shore Crib and the Bell-buoy Crib in Lake Ontario.

The new basin on the Island has been fenced in so as to prevent its being polluted, and a caretaker's cottage has been erected near it and a reliable man appointed to look after it and to constantly examine and report upon the condition of the conduits and manholes in that vicinity. An automatic gauge has been placed in Hanlan's

Crib and an electric alarm signal placed in the Main Pumping Station, set to ring a bell before the water in Hanlan's Crib falls to the point of danger.

Owing to the extreme lowness of the lake levels provision was also made for placing embankments over the conduit at points where there might be danger of its again rising. Two contracts were let for this work—one to the Constructing and Paving Co., for the sum of $5,170, for placing an embankment over the 5-ft. steel conduit between manhole No. 1 and the new Island basin; the other to the Toronto Dredging and Contracting Co., at $5.68 per lineal foot, for piling and filling over the 4-ft. steel conduit from Hanlan's Crib northwardly for a distance of 1,400 feet in Toronto harbour. For further particulars regarding these works and the upheavel of the conduit, I may, in order to save space and avoid repetition, refer to my printed reports to the Committee on Works of the 6th, 9th, 16th and 30th September, 1895, all of which are contained in my 15th Fortnightly Report, dated 30th September, 1895; also to my 17th Fortnightly Report, dated 28th October, 1895; 18th Fortnightly Report, dated 11th November, 1895, and my 21st Fortnightly Report, dated 23rd December, 1895.

MR. MANSERGH'S REPORT.

Owing to the diversity of opinion in the City Council regarding the advisability of continuing the existing pumping system and the persistent efforts made by a company to obtain a franchise for supplying the City by gravity from Lake Simcoe, the Council decided to consult Mr. James Mansergh, C.E., Vice-President of the Institution of Civil Engineers, regarding the future water supply of the City, as he was considered, after careful enquiry by the Council, to be one of the most prominent and reliable authorities on questions of this kind that could be obtained. Mr. Mansergh arrived in Toronto on the 2nd November, 1895, and remained in the City until the 20th November, during which time he examined into the various plans, reports and schemes which have for so many years been engaging the attention of the public.

His report, which is a voluminous and valuable City document, was received here on the 3rd March, 1896, and endorsed the project of constructing a tunnel under the harbour and continuing the water supply to the City from its present source, as recommended in my

report of the 30th October, 1893. He also states that the intake pipe must be laid on the lines already suggested, and recommends that "ultimately" filter beds should be constructed on the Island. He also states that new rising mains will have to be laid to Rosehill Reservoir, and advocates the construction of a new Reservoir at Eglington to hold 50,000,000 gallons.

It is unnecessary that I should refer further to his report, as it has been before the Council and the citizens, and copies of it can be had by all persons who are interested in its perusal.

### SIX-FOOT WOODEN CONDUIT.

During the year it was found necessary to remove the large accumulations of sand from this pipe. The depth of sand in the pipe was found to range from ten to thirty-seven inches, but the interior, for the greater portion of its length under Lake Ontario, is inaccessible, and the sand there cannot safely be got at or removed. The process of pumping the sand from the Island portion of the pipe will have to be continued from time to time until the proposed new six-foot steel conduit is laid.

### SUPPLY.

At the Main Pumping Station the total quantity of water pumped was 6,639,680,218 imperial gallons, the average daily consumption being 18,190,902, against 18,053,403 gallons in 1894. At the High Level Pumping Station the total quantity of water re-pumped during the year was 1,186,103,055 gallons, the average quantity pumped daily being 3,249,596 gallons, as against 3,216,711 gallons pumped in 1894. For further particulars, I must refer to the attached schedules and to the appended reports of the various officers of the Department.

### MAIN PUMPING STATION.

The principal work performed at this Station during the year was the alteration to the eight furnaces connected with Nos: 4 and 5 engines, so as to adapt them for the use of soft coal screenings instead of anthracite coal, which had been previously used.

A contract was let on the 29th April, 1895, to the Hawley Down Draft Furnace Co., of Chicago, at the sum of $7,500 for these alterations.

The four furnaces for Engine No. 4 were completed and put in operation on the 19th June, and soft coal screenings have been used

in these furnaces ever since that date. The test having proved satisfactory, the other four furnaces for Engine No. 5 were converted to the Down Draft system and put in operation on the 26th November, and soft coal screenings have been used in these latter furnaces from that date.

It is estimated that the saving in the cost of fuel which will be effected by the adoption of this system, will be at least $20,000 per annum.

A very great saving has been effected in the consumption of coal at this station within the past four years by reason of the installation of the High Duty Engines, Nos. 4 and 5, and other improvements; the coal consumption having stood as follows:

COAL CONSUMED.

| Year. | Tons. | Cost. | Gallons of Water Pumped. |
|---|---|---|---|
| 1892 | 17,252 | $71,805 25 | 6,659,925,650 |
| 1893 | 13,006 | 64,702 86 | 6,646,021,488 |
| 1894 | 13,411 | 54,902 85 | 6,589,492,142 |
| 1895 | 10,589 | 40,221 85 | 6,639,680,218 |

It is estimated for the coming year that the cost for fuel at this station should not exceed $23,000, providing no mishap occurs to the new engines, which would necessitate using the low duty plant.

During the year three rather serious breaks occurred to No. 4 Engine, the plunger head of the north pump having broken on Jan. 26th, and on Sept. 29th the exhaust arm on the low pressure side broke. On Oct. 1st, the disc on the low pressure side cracked across the crank-pin hole, the collar broke off the crank-pin, and on examination, the steam piston follower on the low pressure side was found to be broken. These breaks were all repaired by the 20th Oct.

## ROSEHILL RESERVOIR.

The reservoir was emptied on the 13th day of September to admit of its being cleaned and the bottom concreted. The weeds and mud being removed from the bottom, the concreting was extended as far as the limited appropriation would allow. A great deal of work was necessitated in the ravine owing to the damage caused by the spring floods and the breaking of a dam higher up the creek. A 12-inch discharge pipe, to facilitate the emptying of the reservoir, was laid from the 24-inch pumping main at the Summerhill entrance and carried down the hill to the creek, a distance of about 1,070 feet.

### REMOVAL OF MAINS.

The 24-in., 30-in. and 36-in. mains, where they cross the G. T. R. yard just south of Front Street, had to be lowered and carried north to the south side of Front Street, to enable the G. T. Railway authorities to enlarge their yard north to the freight shed. In order to utilize the 30-in. main from No. 2 engine between Front and Wellington Streets, on John Street, and to facilitate the delivery of water from Nos. 4 and 5 engines, a 30-in. connection with a valve controlling it was taken off the 36-in. main at Front Street and carried north across Front street, where it was connected to the 30-in. main from No. 2 engine.

### FIVE-FOOT PIPE, SCREEN TANK AND CONNECTIONS.

The contract let during the previous year to the Bertram Engine Works Co. for substituting a 60-in. steel connecting pipe at the Main Pumping Station for the 36-in. cast-iron pipe, has been completed. This contract included the construction and placing of a large steel tank, with screens and gates and the necessary connections, so as to provide a better supply of water to the new Engine House, and also to avoid, as far as possible, the difficulties which had previously been experienced by fish and rubbish finding their way into the pumping wells through the old 3-ft. cast-iron conduit.

Drawings have also been prepared for a new cast-iron lining for the old pumping well. The castings are now being made, and will be put in place as soon as practicable, as it has been found impossible to maintain the lining in the old well in a tight and satisfactory condition.

### METER AND MACHINE SHOPS.

The usual works have been carried out at these shops, a large number of meters having been overhauled and repaired, and a considerable amount of work has also been done for other branches of the Department. During the year 430 meters were taken off for repairs and 1,417 hydrants were repaired, 55 valves and 252 frozen hydrants were thawed out and repaired.

For further information in connection with Water Works matters I beg to refer to the accompanying schedules and reports of the officials of the Department.

Respectfully submitted,

E. H. KEATING, M. Inst. C. E.,
*City Engineer.*

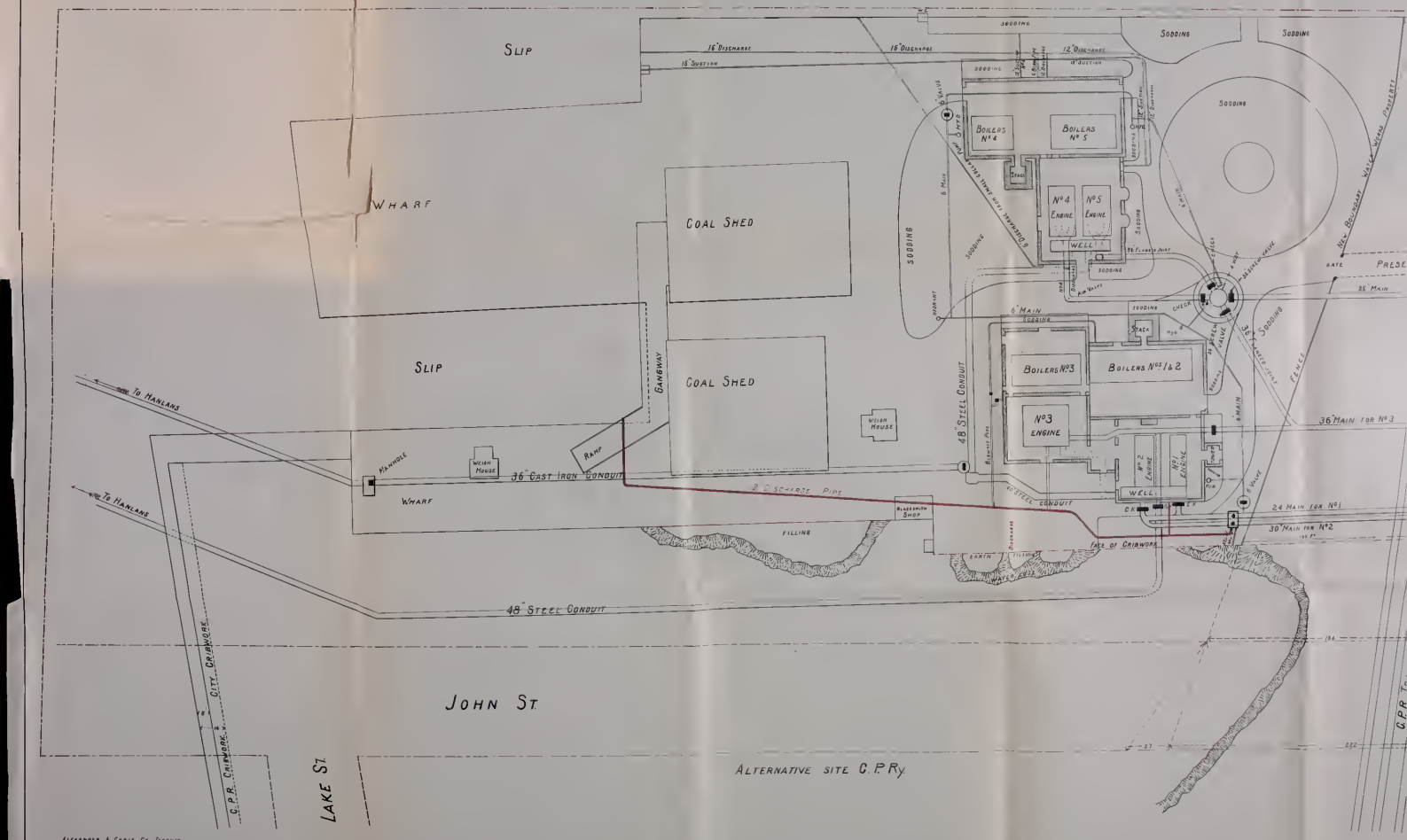
# T.W.W.

## PLAN OF MAINS ETC. AT PUMPING STATI

SCALE 40' TO AN INCH

NOTE.—RED SHEWS ALTE
NEW WORK CONS

1895



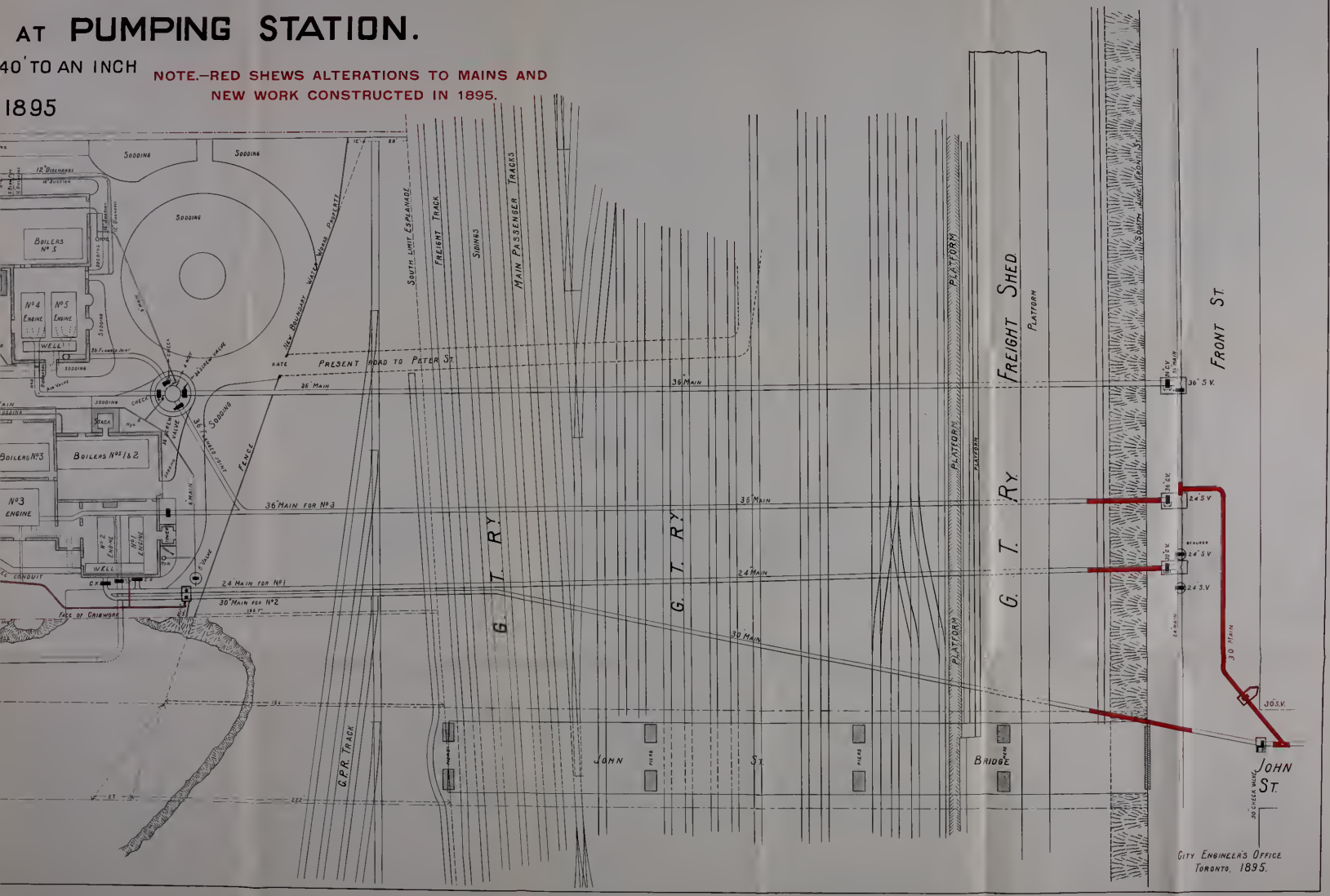
# W.W.

## AT PUMPING STATION.

40' TO AN INCH

1895

NOTE.—RED SHEWS ALTERATIONS TO MAINS AND NEW WORK CONSTRUCTED IN 1895.



# SUMMARY OF STATISTICS.

In Accordance with the Form Recommended by the New England Water Works Association.

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TORONTO, ONTARIO, WATER WORKS.

Population by Police Census of 1891, 188,914.
Date of construction, 1872-7.
By whom owned, City of Toronto.
Source of supply, Lake Ontario.
Mode of supply, pumping.

**PUMPING.**

1. Builders of machinery :

   At Main Station :

   4,000,000 and 8,000,000 gallons daily, low duty, H. R. Worthington.
   8,000,000 gallons daily (Martin pump), Inglis & Hunter.
   Two engines of 10,000,000 gallons daily each, Geo. F. Blake Mfg. Co.

   At High Level Station :

   Two 3,000,000 gallons daily each, Geo. F. Blake Mfg. Co.

2. Description of coal :

   (*a*) Anthracite.
   (*c*) Large egg.
   (*d*) Pittston, Scranton, Lehigh, Lackawanna, Wilkesbarre, or other equally good.
   (*e*) Price per ton, $4.19, delivered in coal shed or on dock.
   ($a^1$) Bituminnous coal.
   ($c^1$) Slack.
   ($d^1$) Reynoldsville (Soldier's Run), Youghiogheny, or other equally good coking coal.
   ($e^1$) Price per ton, $2.35 to $2.50, delivered in coal shed or on dock.
   (*f*) Percentage of ash not recorded.
   (*g*) Price of wood, $3.50 per cord.

3. Coal consumed during year, 21,178,000 pounds.
   (For starting fires, etc., 3 lbs. wood = 1 lb. coal )

4. $\frac{\text{Pounds of wood consumed}}{3}$ = 21,000 lbs. coal.

*5. Total fuel consumed per year, (3 + 4) 21,199,879 lbs.
   * Includes coal for heating, lighting, etc.

6. Total pumpage for year, 6,639,680,218 imperial gallons net.
7. Average static head against which pumps work, 219.28 feet.
8. " dynamic " " 238.82 feet.
9. Number of gallons pumped per pound of coal (3), 313.19.
10. Duty in foot pounds per 100 pounds of coal—no deductions.
    For Nos. 1, 2 and 3 Engines, low duty, 34,029,267.
    For Nos. 4 and 5 high duty Engines,92,067,320.

Cost of Pumping figured on Pumping Station Expenses:

| | |
|---|---|
| Main Pumping Station | $76,906 35 |
| High Level Station | 9,959 14 |
| | $86,865 49 |

11. Per million gallons raised against dynamic head direct (surplus going into Reservoir), 13.08.

11*a*. Per million gallons raised against dynamic head direct (surplus going into Reservoir) Main Pumping Station only, 11.58.

12. Per million gallons raised one foot high (dynamic), $0.0552.

12*a*. Per million gallons raised one foot high (dynamic), Main Pumping Station only $0.0489.

Cost of Pumping Figured on Total Maintenance (including renewals) viz., $421,646.43.

13. Cost per million gallons raised against dynamic head into mains direct (surplus going into Reservoir), $63.50.

14. Cost per million gallons raised one foot high (dynamic), $0.265.

**FINANCIAL.**

MAINTENANCE.

| Receipts. | $ c. | $ c. |
|---|---|---|
| *Division I.* | | |
| From Consumers: | | |
| A. Water rates, domestic .... ..... | 352,437 95 | |
| B. " manufacturing ..... | | |
| C. Net Receipts for water..... | ..... | 352,437 95 |
| D. Miscellaneous (repairs, sales, etc.) ..... | ..... | 6,502 54 |
| E. Total..... | ..... | 358,940 49 |
| From public funds: | | |
| F. Fire hydrants..... | 57,600 00 | |
| G. Fountains ..... | ..... | |
| H. Street watering ..... | 25,000 00 | |
| I. Public buildings and Parks..... | 4,134 46 | |
| J. General appropriations ..... | ..... | 86,734 46 |
| K. Gross receipts from all sources.. | ..... | 445,674 95 |
| *Division II.* | | |
| From fixed rates: | | |
| L. Domestic ..... | 341,762 01 | |
| M. Manufacturing ..... | | |
| N. Total..... | ..... | |
| From meter rates: | | |
| O. Domestic ..... | 97,410 40 | |
| P. Manufacturing..... | | |
| Q. Total..... | 439,172 41 | |
| Expenditures. | | |
| A.A. Maintenance and repairs..... | 123,815 03 | |
| Revenue collection branch ..... | 25,093 03 | |
| Renewals and special repairs (provided for by tax levy) | 48,006 37 | |
| | 196,914 43 | |
| B.B. Interest and sinking fund on debentures ..... | 224,732 00 | |
| C.C. Total for year..... | ..... | 421,646 43 |
| D.D. Balance (after renewals charged as above) ..... | ..... | 24,028 52 |
| E.E. Total..... | ..... | 445,6 95 |

## CONSUMPTION.

1. Estimated total population, 189,000.
2. Estimated population on lines of pipe at date, 186,000.
3. " " supplied at date, 186,000.
4. Total number of gallons consumed for the year, 6,639,680,218 imperial gallons.
5. Passed through domestic meters, imperial gallons, or per cent.
6. " manufacturing meters, imperial gallons, or per cent.
7. Average daily consumption, 18,192,063.
8. Gallons per day to each inhabitant (1), 95 imperial gallons.
9. " " " consumer (3), 97 "
10. " " " tap (distribution 22), 447 "

## DISTRIBUTION.

1. Kind of pipe used, cast iron.
2. Sizes, from 3-inch to 36-inch.
3. Extensions during year, 7,441½ feet.
4. Discontinued during year, 2,768 feet.
5. Total now in use, 248.336.
6. Cost of repairs per mile, $
7. Number of leaks per mile, 0.43.
8. Small distribution pipes, less than 4-inch, 14.196¾ feet.
9. Hydrants added, 43.
10. " number now in use, 2,926.
11. Stop gates added, 40.
12. " now in use, 2,082.
14. Number of blown-off gates, 9.
15. Range of pressure on mains at centre for day and night, 60 to 80 lbs.
" " " low level district " 35 to 80 "
" " " high level " " 20 to 80 "

### Services.

16. Total number, 40,671.
17. Size, from ¾ inch to 6 inches.
21. Services added during year, 357.
22. Number now in use, 40,671.
23. Average length of service, 33 feet.
24. " cost " $16.89.
26. Meters now in use, 1,500.
Indicators " 100.
(*a*) Domestic, etc.,
(*b*) Manufacturing and hoists,
(*c*) Indicators on hoists, 100.
28. Indicators on hoists now in use, 258.

### Remarks.

*Pumping*—Nos. 3, 5, 9, 10, 11, 12, 13 and 14—No allowance made in the figures given under these numbers for coal required for operating electric light plant of 22 arc and 75 incandescent lights, steam for which is taken from boilers which supply the pumps.

# Report of Assistant Engineer on Water Works Construction.

TORONTO, December 31st, 1895.

E. H. KEATING, ESQ.,
*City Engineer.*

DEAR SIR,—I submit herewith the Annual Report of this branch of the Department for the year ending 31st December, 1895:

DISTRIBUTION.

7,441¼ feet of mains have been laid this year, consisting of:

| | | |
|---|---|---|
| 218 | feet of | 30-inch mains. |
| 1,019½ | " | 12 " |
| 6,203¾ | " | 6 " |

and in addition the following valves and hydrants have been added: 1 30-inch valve, 7 12-inch valves, 32 6-inch valves and 43 hydrants, while there have been taken up or abandoned 2,768 feet of old 6-inch cement main, 1 6-inch valve, 1 3-inch valve and 6 hydrants. The old Yorkville and Furniss pattern of hydrants have been replaced with present pattern. For particulars as to size, location, etc., see attached schedules. Thirty-one brick valve chambers have been built, chiefly on streets upon which permanent roadways have been constructed.

SERVICES.

The number of services laid this year was 357, particulars of which will be found in the schedule for same.

The total number of leaks on all sizes of mains for the year was 108, equal to one leak to each 2.3 miles of main: the cost of same, exclusive of asphalt repairs, being $568.89, or an average of $5.26¾ per leak. On only seven of the leaks was material required for repairs. The wash-out at Tannery Hollow on the 10-inch main cost $105 to repair, exclusive of street railway track allowance pavement repairs.

The following statement gives the sizes, number and cost of same:

| Size. | Number. | Cost. |
|---|---|---|
| 36-inch | 1 | $11 62 |
| 30 " | 1 | 12 00 |
| 24 " | 3 | 31 55 |
| 12 " | 44 | 182 16 |
| 10 " | 2 | 108 25 |
| 8 " | 6 | 27 63 |
| 6 " | 50 | 186 09 |
| 4 " | 1 | 9 59 |
| | 108 | $568 89 |

The only cement mains of the Furniss system remaining in use are 1,240 feet of 8-inch on John Street, between King and Queen Streets, and 2,800 feet of 6-inch on Queen Street, between Peter and Bathurst Streets. Further particulars relating to old iron and cement mains will be found in schedule relating to same.

## HYDRANTS.

There are at present four patterns of hydrants in use. Three of them are similar in the valve motion, the difference in two of them being in the size of the barrel, while the third has a third nozzle, adapted for the service of steam fire engines. The fourth is a four-way hydrant of the Chapman Valve Mfg. Co.'s make.

## MAIN PUMPING STATION.

The only work executed at this station was the extension of the discharge pipes from the air pumps of Nos. 1, 2 and 3 engines from opposite the east side of the Engine House southerly across the wharf and into the slip. A connection was also made with the relief valve on the 24-inch and 30-inch mains near the north side of the old Engine House. This work had to be done so that the filling for the approaches to the John Street Bridge could be proceeded with.

## HIGH LEVEL PUMPING STATION.

Outside of cleaning up, sodding, etc., no work was done at this station. Undoubtedly the road should be put in proper order, as it is yearly becoming worse, especially so as the cost of doing it would not be more than $500 or $600.

ROSEHILL RESERVOIR AND PARK.

The Reservoir was emptied on the 13th day of September, so as to allow of it being cleaned and concreted. As soon as the weeds and muck had been removed from the bottom of the Reservoir the concreting of the bottom was proceeded with and extended as far as the limited appropriation would allow, after which it was again filled.

A great deal of work was necessitated in the Park owing to damage caused by the spring freshets and the breaking of a dam higher up the creek, which swept away the bridges and destroyed the dams forming the ponds in the Park, as well as tearing away the bank and covering the bottom or flats with debris. A large amount of work was done in sodding, filling and in construction of paths through the Park portion of the grounds acquired from Dr. Larratt Smith, also in the erection of a number of rustic seats, shelters and additional stairways.

A 12-inch discharge pipe to facilitate the emptying of the Reservoir was laid from the 24-inch pumping main at the Summerhill entrance to the grounds eastwardly along the north side of Summerhill Avenue to the south boundary of Dr. Larratt Smith's property, north of C. P. Ry. boundary, thence across the south end of his lot and down the hill to the creek, a distance of about 1,070 feet. An easement was, however, first secured from Dr. Smith. The usual schedule showing gaugings of the Reservoir for each month of the year is given in Appendix " B."

STABLES.

The stable is in a satisfactory condition, and the drivers and horses have been kept fully employed.

The storehouse has been kept supplied with the necessary materials for the different branches of the Department.

The blacksmith and helper have also been fully occupied.

The Lombard Street Station continues to give satisfaction, but there should be two men on duty at night instead of one, as a sudden call leaves the place without anyone to look after it.

REMOVAL OF MAINS.

The 24, 30, and 36-in. mains, where they cross the Grand Trunk Yard, just south of Front Street, had to be lowered and carried north to the south side of Front Street, to enable the Grand Trunk

authorities to enlarge their yard north of the freight shed. The cost of lowering the 24-in. and 36-in. had to be borne by the City, while the cost of lowering the 30-in. main was obtained from the G. T. R. Co., owing to this main having been laid on John Street.

### 30-INCH CONNECTION ON FRONT STREET.

In order to utilize the 30-in. main from No. 2 Engine, between Front and Wellington Streets, on John Street, and to facilitate the delivery of water from Nos. 4 and 5 Engines, a 30-in. connection, with valve controlling it, was taken off the 36-in. main on Front Street, between what is known as No. 3's 36-in. main and No. 4's, and carried north across Front Street, thence east along the north side of Front Street to John Street, where it was connected by a curve and branch to the 30-in. main from No. 2 Engine, just north of the check valve on No. 2's main at that point, the controlling valve being placed about 40 feet south of the connection on John Street.

In addition to the trouble caused by the accident of the 5th of September last to the conduit, there was the danger of a limited supply of water to the pumps to be provided against. This was caused by the lowness of the lake, which stood at nine inches below zero on the day the conduit rose, and subsequently fell to 25 inches below zero on Harbor Master's gauge. If no measures were taken to provide an ample supply the effect would be to empty the Reservoir and render it impossible to keep up a fire pressure at the hydrants. The contractor who laid the 5-ft. steel conduit informed this Department that his operations had not affected or damaged the old 4-ft. wooden pipe between the shore crib and the north end of the Water Works cut through the Island. This being the case, it was decided to construct a small basin enclosing both the 5-ft. steel and the 4-ft. wooden pipes at a point 2,400 ft. north of the shore crib, and then cut the 4-ft. pipe, blocking the end of the pipe on the north side of the basin to prevent bay water from running back to the basin and polluting the water supply at this point. Two clusters of four piles each were driven, one at each end of a length of the 5-ft. conduit passing through the basin. On these piles were fastened chains passing around the 5-ft. conduit; a strain was put on them by means of jack screws, so that when the basin was emptied, this pipe, which was carrying the supply for the City, would not collapse.

After this had been done, and before the button placed on the south end of the 4-ft. pipe at the shore crib was removed, the water was pumped out of the basin and the 4-ft. pipe between the shore crib and the basin carefully examined by Inspector George Carrette, who reported it sound and in good condition. The basin remained empty for three or four days, although there was a head of about 11 feet of water against the banks, which were composed of fine sand. The button placed on the wooden pipe was found absolutely tight. After flushing out the wooden pipe two or three times to clean it, the basin was filled through openings provided in the button at the shore crib end of it. As soon as the water rose to its full height the length of steel pipe was uncoupled and lifted above the level of the water and there secured to the piles above referred to. Prior to this the loss of head at this point was 2 ft. 9 in., while at present it is only 9 in., producing the same effect as a rise of 2 ft. in the lake level. In addition to this it put a stop to the trouble caused by sand flowing into the pumping well and being carried or forced into the distribution. Since the construction of the basin no sand has found its way to the well.

A substantial fence was built around the basin and a gauge placed in it; a caretaker's cottage built and a man put in charge, who records the height of water in the basin every three hours night and day, and clears the surface of anything carried in from the conduits. An electric gauge connected with the Pumping Station was put in Hanlan's crib and so set as to notify the Pumping Station of any sudden fall of water in the pipes by ringing an alarm bell. This is worked on a closed circuit in the same manner as the fire alarm system. The caretaker tests this each day and is notified by telephone if it is working all right or not.

### ANCHORING CONDUIT.

After the conduits which rose had been lowered into place and the joints made tight, two contracts were let for anchoring same, one for filling over the 5-ft. conduit from the first manhole south of Hanlan's Crib southerly to a junction with the bank forming the north side of the small basin previously referred to. The contract called for a bank ten feet wide on top, carried up to a height of five feet above zero level of lake, with side slopes of two to one. This contract was awarded to the Constructing and Paving Company for the sum of $5,170.

The other contract was for piling and filling over the 4-ft. steel conduit, from the north side of Hanlan's Crib northerly along the line of 4-ft. pipe, for a distance of 1,400 feet, terminating in a saddle crib at the north end. The contract called for two lines of close sheet piling driven one on each side of the conduit, spaced 14 feet apart and carried up 5 feet above zero level, the space between being filled with sand or earth, and a slope of two to one carried down on each side to the level of bottom of bay along line of same. The Toronto Dredging and Contracting Company are the contractors for this work, the price paid for piling and filling being $5.68 per lineal foot of work.

Respectfully submitted,

C. L. FELLOWES,
*Assistant Engineer in Charge.*

# MECHANICAL ENGINEER'S REPORT.

DECEMBER 31ST, 1895.

E. H. KEATING, ESQ.,
*City Engineer.*

DEAR SIR,—I beg to submit a report of the work done under my charge during the year 1895 :

### FIVE-FOOT PIPE, SCREEN TANK AND CONNECTIONS.

During the first month of this year the contract of The Bertram Engine Works, for replacing the 3-foot cast iron conduit in Water Works yard by 5-foot steel conduit, etc., was finished so as to be brought into full use on January 25th ; the filling in and concreting, etc., were, however, not entirely completed until April 12th.

### NEW CAST IRON LINING TO WELL IN ENGINE HOUSE.

Designs and working drawings have been made for this tank, new patterns of plates and screen guides have been made, and the work is now being fixed : the bottom and first tier of side plates are now in place.

### NEW STEEL PIPE TO REPLACE 6-FT. WOOD.

Alternate designs for a 6-ft. steel and cast iron pipe, and for steel and cast iron flexible joints have been made, together with specifications, and have been submitted for tender.

### METER AND MACHINE SHOP.

The various works required by the different departments have been done in all cases as expeditiously as possible. With our small staff many valuable meters have been continued in use, by repairs which have cost very little compared to the value of new meters. The Siemens-Adamson meter, now largely adopted by the Department, is realizing all that is claimed for it; most of the new ones ordered during the year are now in store ; they will be put in as rapidly as possible, without employing extra labor.

The following is a list of meters taken off for repairs during the year and replaced by meters registering accurately:

| | Taken off. | Put on. |
|---|---|---|
| ½-in. meter | 3 | 3 |
| ⅝-in. " | 254 | 213 |
| ¾-in. " | 92 | 76 |
| 1 -in. " | 32 | 33 |
| 1½-in. " | 2 | 1 |
| 2 -in. " | 13 | 12 |
| 3 -in. " | 10 | 7 |
| 4 -in. " | 21 | 9 |
| 6 -in. " | 2 | 2 |
| 8 -in. " | 1 | 3 |
| Total | 430 | 369 |

## VALVE AND HYDRANT SHOP.

The work in this Department has been prosecuted systematically during the year. Some practical changes have been made in hydrant patterns to give increased waterway: in all new hydrants an extra nozzle, 3-in. diameter, has been added for the attachment of steam fire engines.

Besides the large number of small service taps, etc., and special castings tested, repairs are being gradually made to large valves as time is available. The following is a list of work done outside the shop:

| | |
|---|---|
| Number of hydrants repaired | 1,417 |
| " valves repaired | 55 |
| " new valves put in | 46 |
| " " caps | 29 |
| " " cap leathers | 394 |
| " " joint rings | 34 |
| " " leather valves | 29 |
| " " chain rings | 50 |
| " " jackets | 3 |
| " hydrants replaced | 79 |
| " small hydrants replaced with large | 7 |
| " large hydrants replaced with three-way | 1 |
| " screens replaced | 15 |
| " chain rings replaced | 68 |
| " hydrants tightened up with chain and bar | 84 |
| " nozzles caulked | 192 |
| " jackets lowered | 559 |
| " " cut and replaced with short tops | 50 |
| " hydrants plugged | 2 |

| | | |
|---|---|---|
| Number of | plugs taken out | 2 |
| " | hydrants packed and oiled | 2,008 |
| " | " pumped, packed and oiled | 468 |
| " | " frozen, thawed, blown out and oiled | 202 |
| " | " frozen and thawed with boiler | 50 |
| " | four-way hydrants packed and oiled | 10 |
| " | hydrants inspected, being 6 times over the whole City | 19,251 |
| " | mains blown out | 556 |

*Work done inside the Shop.*

| | | |
|---|---|---|
| Number of | hydrants cleaned, repaired, tested and painted | 115 |
| " | " jacketed and tested, complete | 29 |
| " | four-way hydrants cleaned, repaired and tested | 1 |
| " | new hydrants tested | 10 |
| " | " jacketed and tested, complete | 5 |

## REPAIRS TO BROKEN CONDUITS.

When the break in these conduits occurred, on the 5th September, I was put in charge of the repairs and relaying the broken portion. A flexible joint, 125 feet north of Hanlan's Crib, was opened up to get water into the City for fire purposes. At 8.30 the same evening this was accomplished.

The 4-ft. pipe was thoroughly examined from Hanlan's Crib to the Pumping Station; the sleeve put on in 1893, disturbed by this accident, was thoroughly caulked, and the flexible joint that had been removed was again put in place on September 13th. In many cases puddled clay was placed over the joints after being caulked or wedged. The joint immediately north of Hanlan's Crib had all the stone removed from it, and was found sound and tight.

The 5-ft. pipe was also thoroughly examined at the first break, which occurred about 115 feet south of No. 1 manhole: the broken flange, viz., the northerly one, was entirely removed, the south pipe being supported by piles and sling chains. Drawings were made and steel sleeves ordered (similar in construction to those used in 1893). On the 7th September, a large deposit of sand having been found in the pipe at this point, suction hose were inserted in the pipe through No. 1 manhole, and the sand cleaned out so far as the hose could be got in. Divers were sent in at the broken flange mentioned above, and found that sand had accumulated to such a depth—about 20 inches—that the divers were unable to pass over it. Pumps and suction hose were applied and all pumped out as far as hose would

reach, viz., about 120 feet. The sand being still very deep, two lengths of the pipe were lifted out and moved to one side, and another 120 feet of pipe was pumped free of sand; at this distance the depth of sand was only about two or three inches. These pipes were again put in place, new wood gasket put in at the southerly end: but to make sure of a tight joint, a band was put in consisting of a rubber belt, 4-in. x $\frac{1}{2}$-in., and a flexible steel band, securely bolted in place. The steel sleeve to cover the place where cast iron flange was cut away was put in the 19th October; the cast iron flange, close to the south side of No. 1 manhole, was fractured on both sides; a sleeve, precisely the same as the one 114 feet south, was put on, finished and cemented September 28th. All the joints of this pipe were thoroughly examined and caulked where necessary. The joint immediately north of No. 2 manhole was found to be $1\frac{1}{4}$ inches open, and many of the bolts broken: new bolts were put in this flange, and it was brought together within $\frac{7}{8}$ths of an inch: the space was thoroughly wedged, and a steel and rubber band firmly secured, as before described. The 8th joint, south of No. 2 manhole, was also found open; a band that had been placed there on a former occasion (at the time the pipe was laid) was not covering the opening. This was removed and a new flexible steel and rubber band was placed upon it.

PUMPING SAND FROM SIX-FOOT WOODEN PIPE.

This pipe was again found partly filled with sand; commenced pumping this from the shore crib September 20th. No sand was found in the crib, but it commenced at about 15 feet southward: at about 80 feet it was 15 inches deep; at the first manhole it was 18 inches deep; at the second manhole it was still 18 inches deep, but at the third manhole it was 25 inches deep. Going southward 55 feet from the third manhole the depth of sand increased to 29 inches, and at a point 80 feet south the depth was 37 inches (this point was the farthest reached in 1893). From this point southward the depth of sand decreased, and at 100 feet south the stuff being pumped appeared to be slimy, black mud, with very little sand. This material continued until 140 feet south had been reached: the depth here was from 18 to 20 inches. The diver entered at the third manhole and went in 520 feet; the deposit at this point was only about 10 inches.

SHORE CRIB.

In the summer of 1893 the old 4-ft. wooden pipe was severed from the crib and the space filled up with sand and gravel. In order to bring this pipe again into use, it must be re-connected on the north side of the crib. The space was only about four feet wide, so heavy pine slides were constructed and spiked firmly to the crib on each side of the wooden pipe, and close to it gates of 3-inch tongued and grooved pine, jointed with white lead and with rubber pad at bottom, were constructed and placed in the slides. They were thoroughly caulked and backed up with puddled clay at each corner. The backs being again filled and rammed with sand and gravel, the inside sheeting of the crib was carefully cut away and all intervening spaces covered with fitted wooden pads, securely spiked and caulked, so that a perfect connection was made between the shore crib and the 4-ft. wooden pipe. A tightly fitting cover was placed over the new gates above zero level of water.

Respectfully submitted,

J. WILLIAMS,
*Mechanical Engineer Water Works.*

# REPORT OF CHIEF ENGINEER OF MAIN PUMPING STATION.

DECEMBER 31ST, 1895.

E. H. KEATING, ESQ.,
*City Engineer.*

DEAR SIR,—In compliance with your request, I beg to submit to you the Annual Report of this Pumping Station for the year 1895:

During the year just ended, the whole plant in general is in good condition. The old plant, consisting of two low duty type Worthington Engines and one Inglis & Hunter Engine, have required only ordinary running repairs. The boilers are all sound and clean, and have not required any repairs during the year.

The pumps also are all in good condition. I would recommend the converting of No. 1 and No. 2 Worthington Engines into high duty type at an early date, as we would then be in a much better position to supply any increased demand, and also better prepared should anything disable the engines.

Below I submit to you a summary of repairs and other work done during the year.

SUMMARY OF REPAIRS TO ENGINE No. 1.

1. Plungers and rods taken out and trued up in lathe.

2. New joints made on suction and discharging sides of pumps; new joints to steam chests and cylinders.

3. The main pump seats all removed, cleaned and replaced with new valves and spindles.

4. The foundations, pumps, and suction and discharge pipes were all painted; new drip pans were made and placed under all joints of discharge pipes, which completes the repairs to Engine No. 1.

SUMMARY OF REPAIRS TO ENGINE No. 2.

1. Plungers and rods taken out and trued up in lathe.

2. New joints to valve seats of north and south pump.

3. Air pump buckets re-packed: new rubber valves and brass covers and springs: crank shaft bearings re-babbited.

4. New joints made on suction and discharging sides of pumps.

5. The main pump seats all removed, cleaned and replaced with new valves and spindles.

6. The foundations, pumps, and suction and discharge pipes were all painted; new drip pans were made and placed under all joints of discharge pipes. This completes the repairs to Engine No. 2.

SUMMARY OF REPAIRS TO ENGINE No. 3.

1. The air pumps all re-packed: new valves and valve spindles to same.

2. The dash-pots of both cylinders re-packed: new brass liner put in condenser of north air pump.

3. Air pumps all connected to main suction pipes: motion of engine all overhauled and replaced, which completes the repairs to Engine No. 3.

SUMMARY OF REPAIRS TO FOUR BOILERS OF BATTERY No. 1.

1. Fire boxes newly lined with fire brick; combustion chambers all replaced by new brick; a new brick wall built on north end of boilers; furnaces rebuilt from bottom to back end; top arches all renewed; new baffle plates to fire-hole doors; globe valves, asbestos blow off cocks all re-packed: two new grate bars to furnaces.

2. New rubber gasket rings to joints of manhole covers: new joints to steam pipes, safety and stop valves: tubes all thoroughly cleaned out, which completes the repairs to boilers No. 1.

SUMMARY OF REPAIRS TO FOUR BOILERS OF BATTERY No. 2.

1. Newly lined fire boxes and combustion chambers: new baffle plates to fire-hole doors: five new grate bars to furnaces: tubes all thoroughly cleaned out.

2. New joints to steam pipes, safety and stop valves: new rubber gasket rings to joints of manhole covers.

3. Angle valves, asbestos blow-off cocks, plug cocks, and globe valves all repaired. This completes the repairs to boilers No. 2.

SUMMARY OF REPAIRS TO FIVE BOILERS OF BATTERY No. 3.

1. Fire boxes newly lined; combustion chambers, bridges and side walls all rebuilt; new baffle plates to fire-hole doors; new frames for holding grate-bars in position; seven new grate-bars to furnaces.

2. New joints to steam pipes, safety and stop valves: new rubber gasket rings to joints of manhole covers; tubes all thoroughly cleaned out.

3. Asbestos blow-off cocks, plug cocks, angle valves and globe valves all repaired, which completes the repairs to boilers No. 3.

SUMMARY OF WORK DONE TO AND ABOUT OLD ENGINE HOUSE.

1. A new eduction pipe was laid, for the purpose of connecting the discharge pipes of Engines Nos. 1, 2 and 3; also blow-off pipes from boilers, on account of the filling in of slip on the east side of old Engine House.

2. The iron smoke stack, running from battery of boilers No. 3 to chimney, also fronts of boilers 1, 2 and 3 have been painted during the year.

3. The iron roof and standards of alleyway, back of batteries of boilers Nos. 1 and 2, have been painted.

4. The doors of valves of No. 2 Engine main were broken: these were replaced by new ones.

5. The valves and connections inside of four-way chamber have been painted during the year.

6. The water troughs and down-spout of old Engine House were apart in many places. They have been repaired and drained into sewer.

7. The cover of four-way chamber, also cover to tank of valve connections of the 4-ft. and 5-ft. conduit pipes, have been painted.

8. The walls and ceiling of old Engine House, and woodwork inside and out, have been painted during the year.

9. The Blacksmith's Shop, on the east side of old Engine House, has been converted into a small work-shop, where light repairs are made. Also a small addition was built for blacksmith's shop, where forge and all tools are kept.

10. The cast iron lining of pumping well of old Engine House has been taken out, and depth of well increased eight inches. Work commenced on November 12th, but owing to the decrease in fire pressure and loss of water sustained in Reservoir, the engines could only be shut down for twenty-four hours each time. By December 30th the new bottom plates and bottom row were placed in position, all connections being satisfactorily made.

The two new Blake Pumping Engines, Nos. 4 and 5, with the exception of a few accidents that occurred, and which are mentioned as under, have been running steadily during the year.

On January 26th, the plunger head of north pump of Engine No. 4 broke; repairs were made by being replaced by a new one, and engine was again started running on January 29th.

On March 4th, the Webb connection to main bearings and race-way of pump of Engine No. 4 cracked; repairs were made by placing two new steel plates 1 inch thick on each side of rib, and engine again resumed duty on March 11th.

On September 29th, the exhaust arm on low pressure side of Engine No. 4 broke: repairs were made by replacing the broken arm by a new one, and engine was again started running on September 30th.

On October 1st, the disc on low pressure side of Engine No. 4 cracked across the crank pin hole, also the collar broke off crank pin, and the piston inside of steam cylinder was found broken. Repairs were commenced immediately on removing broken parts of engine, and were sent to the Polson Iron Co., they having the patterns of same; new ones were made and erected; engine being thoroughly overhauled, again resumed duty on October 20th.

On October 28th, the main pin on high pressure side of Engine No. 5 was found loose. It was taken out and replaced by a new one, when engine was again started running on November 2nd.

Necessary running repairs to batteries of boilers Nos. 4 and 5, and attachments, have been attended to during the year, and they are all sound and clean. The feed pumps, air pumps and all appurtenances to engines are all in good working condition.

SUMMARY OF WORK DONE TO AND ABOUT NEW ENGINE HOUSE.

1. A new oil filter has been fitted up in basement of new Engine House, and is so arranged that the waste oil from engine bearings is run back into the filter, so that the oil is being used over again, resulting in a great saving in the cost of oil.

2. New drip pans were placed under the discharge pipes and pumps of Engines Nos. 4 and 5.

3. Two oil pumps were fitted up in new Engine House for pumping the oil up from tanks in basement.

4. A new recording gauge has been erected in new Engine House for indicating the flow of lake above and below zero.

5. The walls and ceiling of new Engine House, and woodwork inside and out, have been painted during the year.

6. A new electric alarm signal has been erected in new Engine House, and is connected to Hanlan's crib, for the purpose of warning the engineer in charge, in case the water should lower at that point beyond what is allowed.

7. A new automatic lubricator has been attached to the boiler feed pipes of batteries Nos. 4 and 5, so as to feed the boilers regularly with purger.

8. The water feed pipes of battery of boilers No. 4 have been covered with Russia iron during the year.

9. The two batteries of boilers supplying Nos. 4 and 5 Engines were equipped with the Hawley Down-Draft Furnaces, which have proved very satisfactory and resulted in a great saving in the cost of fuel.

10. A new steam pipe connection has been laid between new and old Engine Houses and is connected to the top of battery of boilers No. 4. Its use is for the lighting and heating of both Engine Houses.

11. The two new Blake Engines, Nos. 4 and 5, have been painted and striped during the year.

12. Throughout the season the grass on the grounds was cut and the roadways cleaned, and some ornamental trees planted and the usual supply of flowers.

Yours respectfully,

ROBERT PINK,
*Chief Engineer at Main Pumping Station.*

# REPORT OF THE ENGINEER IN CHARGE OF THE HIGH LEVEL PUMPING STATION.

TORONTO, December 31st, 1895.

E. H. KEATING, ESQ.,
*City Engineer.*

DEAR SIR,—I beg to submit the following report of the condition of the plant and work done during the year 1895:

ENGINES.

Nothing has occurred to the Engines in the way of breakage: in February they were thoroughly examined, all necessary adjustments made, probable renewals noted and provided for. They are at present in first-class working order.

PUMPS.

The plungers and sleeves of main pumps were renewed early in the year, all valves cleaned, springs renewed and adjusted: they have worked throughout the year without any mishap. The plungers and sleeves are again worn and will require renewal very shortly; the pump rods are much worn, and a spare one should be provided as soon as possible.

BOILERS.

The boilers have not required any repairs during the year; they are sound and clean, but the furnaces will require re-lining at an early date.

AUXILIARIES.

The air pumps, feed pumps and all appurtenances to engines and boilers are in good condition.

BUILDINGS.

Necessary repairs have been done to buildings; a fresh coat of paint is badly needed to preserve the woodwork.

I would again urge the necessity of putting the roadway around the Engine House in good condition. During the winter and wet weather it is very difficult to deliver coal to the shed, and during the summer the Engine Room is filled with dust.

A new hardwood casing has been placed over the steam chests of No. 2 Engine, made on an iron frame and lined with asbestos. Material and framework are on hand for renewing the covering to No. 1 Engine steam chests.

Yours faithfully,

CHAS. HEAL,
*Engineer in Charge.*

# APPENDIX "A."

## ACCOUNTANT'S STATEMENT.

CITY ENGINEER'S OFFICE,
December 31st, 1895.

E. H. KEATING, ESQ.,
*City Engineer.*

DEAR SIR,—

I attach herewith, statement showing expenditure for the year ending December 31st, 1895, also details of contract, material and labor on the several works.

Yours truly,

WM. McCARTNEY.
*Accountant.*

| For Abstract of Charges see Page | ACCOUNTS. | $ c. | $ c. | $ c. |
|---|---|---|---|---|
| | GENERAL WORKS. | | | |
| 99-101 | Bridges, repairs and maintenance. | 9,205 99 | | |
| 101 | Culvert cleaning | 8,373 27 | | |
| 101 | Engineering and expenses | 32,113 83 | | |
| 102-103 | General purpose | 39,511 69 | | |
| 103-104 | Roadways | 29,614 04 | | |
| 104 | Reconstruction of cedar block pavements | 2,118 70 | | |
| 104 | Sidewalks | 21,455 63 | | |
| 105 | Street cleaning | 54,559 56 | | |
| 105 | Snow cleaning | 6,923 02 | | |
| 105-106 | Street watering | 49,939 84 | | |
| 106-107 | Scavengering | 57,094 31 | | |
| 107 | Stone and wooden crossings | 2,781 64 | | |
| 107 | " " kerbs | 2,185 78 | | |
| | | 315,877 30 | | |
| 108 | Deduct amount at credit of private drains | 102 84 | | |
| | | | 315,774 46 | |
| | SPECIAL WORKS. | | | |
| 108 | Ashbridge's Bay improvement | 33,274 54 | | |
| 108 | Dredging sewage at slips | 972 62 | | |
| 108 | Don River improvement | 172 59 | | |
| 108 | Danforth Avenue improvement | 500 00 | | |
| 109 | Esplanade agreement | 891 70 | | |
| 109 | Level crossings | 2,691 80 | | |
| 109 | Lake Shore Road Macadamizing | 44 35 | | |
| 109 | New City Stables | 4,232 81 | | |
| 109 | Public Lavatory | 310 99 | | |
| 110 | Prince of Wales Walk and Fence | 288 41 | | |
| 110 | Relief Sewers | 1,650 35 | | |
| 110 | Rosedale Valley Road | 40,264 01 | | |
| 110 | Sewer extension to Windmill Line. | 378 55 | | |
| 110 | Sidewalk and seats on Lake Shore Road | 1,077 54 | | |
| 111 | Steam Road Roller | 3,490 43 | | |
| | | | 90,240 69 | |
| 111 | Railway pavements | ..... | 41,727 48 | |
| | Local Improvement Works : | | | |
| 111-112 | Pavements | 94,480 97 | | |
| 112 | Sewers | 8,201 80 | | |
| 112 | Sidewalks, wooden | 22,078 34 | | |
| 112 | " patent | 14,891 51 | | |
| 113 | Bridges, extensions and openings | 3,729 25 | | |
| | | | 143,381 87 | |
| | Personal and Departmental acc'ts | ..... | 46,007 26 | |
| | Total | ..... | | 637,131 76 |

| DETAILS. | $ c. | $ c. | $ c. |
|---|---|---|---|
| BRIDGE REPAIRS AND MAINTENANCE. | | | |
| *Crawford Street.* | | | |
| Lumber, 40,868 ft | 556 49 | | |
| Nails, 1,500 lbs., $44.75 ; coal oil, 5 gals., 85c.; can and wick, 30c. | 45 90 | | |
| Proportion of drawing table | 5 00 | | |
| Labor | 438 66 | | |
| | | 1,046 05 | |
| *Cut Fish Pond.* | | | |
| Lumber, 3,236 ft., $44.30 ; nails and spikes, 200 lbs., $5.29 ; labor, $49.66. | 99 25 | | |
| | | 99 25 | |
| *Dundas Street.* | | | |
| Lumber, 1,470 ft., $31.50 ; labor, $2.40 .. | 33 90 | | |
| | | 33 90 | |
| *Eastern Avenue.* | | | |
| Lumber, 6,426 ft., $115.70 ; nails, 125 lbs., $5.96 ; rope, 300 ft., $8.55 | 130 21 | | |
| Paint, 84 gals, $81.30 ; brushes, 11, $9.95 ; oil (raw), 4 gals., $2.04 | 93 29 | | |
| Benzine, 4 gals., $1.40 ; oil cans, 3, $1.20 ; wrench, 1, $1.25 | 3 85 | | |
| Files, 2, 40c. ; proportion of drawing table, $5 ; labor, $272.51 | 277 91 | | |
| | | 505 26 | |
| *Gerrard Street.* | | | |
| Lumber, 6,326 ft., $87.37 ; nails and spikes, 1,099½ lbs., $33.93 | 121 30 | | |
| Paint, 100 gals., $155 ; turps, 14 gals., $5.88 ; boiled oil, 14 gals., $7.56 | 168 44 | | |
| Rope, 490 ft., $13.50 ; bolts, 6, 60c. ; files, 1, 15c. ; brushes, 30, $21.40 | 35 65 | | |
| Cans, 6, $1.20 ; signs, 2, $5 ; proportion of table, $5 ; labor, $475.49 | 486 69 | | |
| | | 812 08 | |
| *Glen Road.* | | | |
| Lumber, 16,969 ft., $240.04 ; nails, 753 lbs., $22.20 | 262 24 | | |
| Rope, 1,784 ft., $44.64 ; paint, 73 gals., $86.75 ; boiled oil, 5 gals., $2.70 | 134 09 | | |
| Turps, 5 gals., $2.10 ; dryers, 1 gal., $1.76; brushes, 48, $31.65 | 35 51 | | |
| Pails and cans, 11, $4.60 ; putty, 18½ lbs., 33c. ; blocks and sheaves, 11, $17.75 | 22 68 | | |
| Iron chisels, scrapers, hangers, etc. | 14 00 | | |
| Proportion of drawing table | 5 00 | | |
| Taking down and replacing span of bridge. | 79 25 | | |
| Labor | 549 62 | | |
| | | 1,102 39 | |
| *Carried forward* | | 3,598 92 | |

| | $ c. | $ c. | $ c. |
|---|---|---|---|
| *Brought forward* | | 3,598 93 | |
| *Huntley Street.* | | | |
| Lumber, 28,741 ft., $430.30; cedar posts, 24 ft., 50c | 430 80 | | |
| Nails and spikes, 1,100 lbs., $30.13; blocks, 4, $8.50 | 38 63 | | |
| Paint, 142 gals., $102.88; benzine, dryers and turps, 11 gals., $8.54 | 111 42 | | |
| Brushes, 12, $10.20; proportion of drawing table, $5; labor, $783.01 | 798 21 | | |
| | | 1,379 06 | |
| *Humber.* | | | |
| Lumber, 33,789 ft., $480.00; nails, 1,305 lbs., $46.80 | 526 80 | | |
| Bolts, washers, files, cans, etc | 6 74 | | |
| Paint, 2 gals., $2.85; boiled oil and turps, 1 gal., 48c.; brushes, 3, $1.20 | 4 53 | | |
| Proportion of drawing table, $5; labor, $342.67 | 347 67 | | |
| | | 885 74 | |
| *Parliament Street, Lover's Walk.* | | | |
| Labor | 2 88 | | |
| | | 2 88 | |
| *Sherbourne Street.* | | | |
| Lumber, 685 ft., $15.88; nails, 130 lbs., $4.75; rope, 260 ft., $12.98 | 33 61 | | |
| Paint, 85 gals., $106.25; boiled oil and turps, 20 gals., $9.60 | 115 85 | | |
| Brushes, 24, $14.70; Scrapers, 6, $3; iron, putty, etc., $6.57 | 24 27 | | |
| Proportion of drawing table, $5; labor $1,052.23 | 1,057 23 | | |
| | | 1,230 96 | |
| *Strachan Avenue.* | | | |
| Lumber, 11,250 ft., $157.96; nails, 500 lbs., $16.25; brace and bit, 1, $3.35 | 177 56 | | |
| Pipe wrench, 1, $3; broom, $1.25 | 4 25 | | |
| Proportion of drawing table, $5; labor, $234.14 | 239 14 | | |
| | | 420 95 | |
| *Shaw Street.* | | | |
| Lumber, 53,305 ft., $727.95; nails, 1,800 lbs. $49.90 | 777 85 | | |
| Jack screw, 1, $10.50; iron bars, saws, files, tape lines, etc., $22.29 | 32 79 | | |
| Proportion of drawing table, $5; labor, $680.46 | 685 46 | | |
| | | 1,496 10 | |
| *Carried forward* | | 9,014 62 | |

| | $ c. | $ c. | $ c. |
|---|---|---|---|
| *Brought forward* | | 9,014 62 | |
| *Winchester Street.* | | | |
| Paint, 30 gals., $33.00; turps, oil and dryers, 9 gals., $6.68 | 39 68 | | |
| Nails, 25 lbs., $1.25; labor, $150.44 | 151 69 | | |
| | | 191 37 | |
| | | | 9,205 99 |
| CULVERT CLEANING. | | | |
| Lumber, 413 ft., $5.49; nails, 34 lbs., $5.67 | 11 16 | | |
| Galvanized iron, 13 sheets, $18.20; house Nos., $3.75; street signs, 25, $25 | 46 95 | | |
| Scythe, scythe blades and stones | 6 40 | | |
| Iron and rivets, 113 lbs., $6.37; fire shovels, 4, $1 | 7 37 | | |
| Paint, 5 lbs., $95c.; labor, $8,300.44 | 8,301 39 | | |
| | | | 8,373 27 |
| ENGINEERING AND EXPENSES. | | | |
| Horse keep and shoeing | 586 05 | | |
| Hack hire, hire of paymaster's buggy and repairs | 217 80 | | |
| Advertising, car tickets, postage stamps and petty expenses | 1,234 25 | | |
| Subscription to journals, books, pamphlets, etc | 264 26 | | |
| Rent of 'phones, and rent of office *re* Street Railway traffic | 67 75 | | |
| Mathematical instruments and repairs | 237 38 | | |
| Mounting maps, plans, etc., for Annual Report | 1,029 38 | | |
| Type writing supplies, engineering and general office expenses | 151 06 | | |
| Veterinary services, harness, repairs, etc. | 31 10 | | |
| Photos, boat hire and ferry tickets | 60 05 | | |
| Horse feed and straw for plumber's horse | 21 77 | | |
| Smoke testing machines and rubber hose | 72 01 | | |
| Lumber, iron, steel, paint, varnish, etc | 47 97 | | |
| Blue print paper, ink and colors, brushes | 62 30 | | |
| Machine oil and tap | 21 35 | | |
| Deputation expenses *re* sundry works | 274 35 | | |
| Cost of private driveways on Bloor Street, Yonge to Sherbourne | 2,182 67 | | |
| Salaries, engineering staff | 30,691 33 | | |
| | | 37,252 83 | |
| *Cr.* | | | |
| Amount charged to railway pavements | | 5,139 00 | |
| | | | 32,113 83 |
| *Carried forward* | | | 49,693 09 |

| | $ c. | $ c. | $ c. |
|---|---|---|---|
| *Brought forward* | | | 49,693 09 |
| GENERAL PURPOSE. | | | |
| Lumber, 65,361 ft., $1,134.43; nails, 903 lbs., $26.64 | 1,161 07 | | |
| Bricks, 221,525, $1,420.08; old bricks, 27,450, $82.35; paving bricks, 17,890, $355.91 | 1,858 34 | | |
| Cement, 899½ bbls., $1,972.28; Thorold cement, 18 bbls., $20.70 | 1,992 98 | | |
| Sand, 472¼ yds., $359.32; standard sand, 105 lbs., $4.44; gravel 19 yds., $15.15 | 378 91 | | |
| Pipe, 6-in., 114 ft., $10.32; 9-in., 954 ft., $130.01; 12-in., 2,124 ft., $514.61 | 654 94 | | |
| Pipe, 15-in., 32 ft., $7.12; 18-in., 68 ft., $20.20; 2-in., 384 ft., $5.26 | 32 58 | | |
| Elbows and bends, 6-in., 18, $3.30; 9-in., 35, $9.03 | 12 33 | | |
| Junctions, 33, $44.40; slants, 5, $1.25; Reducers, 1, 10c. | 45 75 | | |
| Manhole tops, 124, $930.60; manhole steps, 1,157, $190.71 | 1,121 31 | | |
| Closed manhole covers, 35, $193.24; culvert tops, 11, $56.42 | 249 66 | | |
| Culvert traps, 71, $355; St. George culverts, 2, $51 | 406 00 | | |
| Flush tank syphons, 8, $440; culvert grates, 1, $7.63 | 447 63 | | |
| Copperas, 67,900 lbs., $490.83; repairing flush tank, $13.30 | 504 13 | | |
| Cedar blocks, 10⅓ cords, $65.43; cedar posts, 60 ft., $2.80 | 68 27 | | |
| Horse keep, $432.40; car tickets and cab hire, $284 | 716 40 | | |
| Hose, 660 ft., $620; nozzles, couplings and expansion rings, $19.45 | 639 45 | | |
| Rubber boots, 26 pairs, $140 45; repairs to same, $12.94 | 153 39 | | |
| Iron, 12,515 lbs., $215.63; bolts, washers and nuts, 180, $13.99 | 229 62 | | |
| Coal oil, 244 gals., $42.16; oil cans, 5, $1.45; lanterns, globes, etc., $35.78 | 79 39 | | |
| Tapes, levels, rules, set squares and repairs | 77 15 | | |
| Harness and buggy repairs | 68 13 | | |
| Sewer pails, rope, pulleys, axes, saws, etc. | 175 62 | | |
| Sundry chemicals for analyst | 25 44 | | |
| Gasket, candles, drills, steel buckets, pick handles, etc | 48 24 | | |
| Paint, glass, putty, oil, turps, dryers, etc. | 80 44 | | |
| Pile hammer and gear, frames, steel ventilating door, etc | 100 21 | | |
| Repairing windlass, galvanized iron pipe, ventilators, screens, etc | 135 98 | | |
| *Carried forward* | 11,463 36 | | 49,693 09 |

| | $ c. | $ c. | $ c. |
|---|---|---|---|
| *Brought forward* | 11,463 36 | | 49,693 09 |
| Mounting maps, blue print paper, ink colors, etc. | 196 10 | | |
| Metallic shingles, stores, etc. | 80 50 | | |
| Water Works charges, removing services and fire hydrants | 227 84 | | |
| Removing gas mains on Queen St. | 127 22 | | |
| Repairing pavements over sewers and drains | 348 00 | | |
| Proportion of power hammer | 275 00 | | |
| Rent of 'phones, wharf yards and office | 337 61 | | |
| Special flushing syphon (freight, etc) | 141 27 | | |
| Constructing area in rear of Standard Bank | 36 00 | | |
| Deputation expenses *re* Dineen's suit | 93 00 | | |
| Amount paid Lorsch for damages | 290 00 | | |
| Jarvis Estate, for lot on Yonge St. | 4,000 00 | | |
| Inspection on private drains | 668 19 | | |
| Labor | 21,317 60 | | |
| | | | 39,511 69 |
| ROADWAYS. | | | |
| Lumber, 100,680 ft., $1,553.38 ; nails and spikes, 373 lbs., $15.41 | 1,568 79 | | |
| Cedar blocks, 715½ cords, $4,287.96 ; cedar kerbing, $13.50 ; cedar posts, 43 ft., $1.87 | 4,303 33 | | |
| Macadam, 153 loads, $287.70 ; sand and gravel, 738 yds., $570.80 | 858 50 | | |
| Cement, 186 bbls., $399.08 ; bricks, 2,050, $12.99 ; paving bricks, 25,850, $380.10 | 792 17 | | |
| Crossing stone, 276 ft., $110.40 ; gutter stone, 35 ft., $12.60 ; kerb stone, 63 ft. 6 in., $38.10 | 161 10 | | |
| Granite sets, 1,210, $72.60 ; lime, 2 bbls., $1.50 ; pitch and tar, 7 bbls., $17.50. | 91 60 | | |
| Iron and steel, 4,713½ lbs., $185.41 ; iron screws, 3, $44.55 ; taps and dies, 3, $13.85 | 243 81 | | |
| Coal, 20½ tons, $95.97 ; wood, 2 cords, $11.50 | 107 47 | | |
| Castings and machine work (repairs on roller) | 100 19 | | |
| Coal oil, lamps, globes, wick, etc. | 34 37 | | |
| Screws, locks, hinges, bolts, washers and sundry hardware | 155 85 | | |
| Spokes, wheels, axles, springs, harness, trimmings, etc. | 217 23 | | |
| Paint, turps, oil dryers, varnish, brushes, etc | 151 77 | | |
| Pipe, junctions, bends, taps, fire clay, etc. | 58 64 | | |
| Asphalt roofing, towing scow and veterinary services | 24 30 | | |
| Cherry Street piling | 51 00 | | |
| *Carried forward* | 8,920 12 | | 89,204 78 |

| | $ c. | $ c. | $ c. |
|---|---|---|---|
| *Brought forward* | 8,920 12 | | 89,204 78 |
| Rent of wharf, yards, engines and 'phones | 677 52 | | |
| Use of roller, paid A. J. Brown | 29 50 | | |
| Proportion of power hammer and lathe | 375 00 | | |
| Repairs to sundry pavements | 1,033 23 | | |
| Electric lights at stables and crematory | 217 20 | | |
| Horse feed and straw | 462 45 | | |
| Damages to house on Queen Street | 150 00 | | |
| Labor | 17,763 13 | | |
| | | 29,628 15 | |
| *Cr.* | | | |
| Amount paid Treasurer for use of roller, blocking, moving bricks, etc. | | 14 11 | |
| | | | 29,614 04 |
| RECONSTRUCTION OF CEDAR BLOCK PAVEMENTS. | | | |
| Lumber, 7,474 ft., $108.84; cedar blocks, 24 cords, $151.92 | 260 76 | | |
| Nails and spikes, 200 lbs., $4.46; gravel, 6 yds., $4.80; castings, $9.75 | 18 95 | | |
| Spark arrester, $100; use of engine, $70 | 170 00 | | |
| Coal oil, lanterns, globes, wick and grease. | 12 15 | | |
| Asbestos, cylinder oil and sundry hardware | 107 85 | | |
| Spokes, hubbs, locks, paint, boiled oil, etc | 90 86 | | |
| Rent of Hamilton wharf | 165 00 | | |
| Labor | 1,293 13 | | |
| | | | 2,118 70 |
| SIDEWALKS. | | | |
| Lumber, 366,655 ft. | 4,930 47 | | |
| Nails, 15,706 lbs., $361.07; spikes, 525 lbs., $16.33 | 377 40 | | |
| Cement, 24 bbls., $51.08; cedar blocks, 10 cords, $49.90; cedar posts 1 cord, $5.36 | 106 34 | | |
| Bricks, 18,000, $142.34; sand, 18 yds., $13.50; coal, 26 tons, $122.90; wood, $5.50 | 284 24 | | |
| Laths, lime, shingles, coal oil and sundry hardware | 133 94 | | |
| Wood lathe, lawn mower, band and circular saws, etc | 68 02 | | |
| Revision of Atlas, street directories, ferry fares, cartage, etc | 75 03 | | |
| Rent of 'phones, yards, office and Parkdale siding | 771 18 | | |
| Rent of portable engine, $25; horse feed and straw, $356.27 | 381 27 | | |
| Water Works charges, moving services, etc. | 72 34 | | |
| Constructing sidewalks corner Queen and Yonge Streets | 345 00 | | |
| Labor | 14,931 08 | | |
| | | 22,476 31 | |
| *Carried forward* | | | 120,937 52 |

| | $ c. | $ c. | $ c. |
|---|---|---|---|
| *Brought forward* | | 22,476 31 | 120,937 52 |
| *Cr.* | | | |
| Amount paid Treasurer for sidewalk extensions | | 1,020 68 | |
| | | | 21,455 63 |
| STREET CLEANING. | | | |
| Lumber, 3,317 ft., $61.15; nails, 271 lbs., $19.05; freight, $1.35 | 81 55 | | |
| Iron and steel, 4,411 lbs., $146.38; brush wire, 3,429 lbs., $419.70 | 566 08 | | |
| Bass for brooms, 220 lbs., $70.40; locks, hinges, bolts, etc., $49.13 | 119 53 | | |
| Lathe work, $17.30; sprocket chain and wheel, $32.05; axles, $10 | 59 35 | | |
| Wrenches, files, spades, castings, and sundry hardware | 119 93 | | |
| Rubber boots, paint, sperm oil, coal oil, cans, etc | 39 26 | | |
| Coal, 4 tons, $19.60; meals for laborers, $15; rent of 'phone, $14.58 | 49 18 | | |
| Machine lathe (proportion) | 125 00 | | |
| Labor | 50,299 28 | | |
| " on asphalt roads | 3,103 40 | | |
| | | 54,562 56 | |
| *Cr.* | | | |
| Amount paid Treasurer for asphalt sweeper | | 3 00 | |
| | | | 54,559 56 |
| SNOW CLEANING. | | | |
| Snow shovels, 174, $48.50; tapes, stationery and sundry hardware, $40.86 | 89 36 | | |
| Labor | 6,833 66 | | |
| | | | 6,923 02 |
| STREET WATERING. | | | |
| Lumber, 20,193 ft., $409.43; nails, 315 lbs., $17.75; bolts and nuts, 6,130, $58.47 | 485 65 | | |
| Iron and steel, 9,090 lbs., $259.30; horseshoe iron, 1,111 lbs., $33.33 | 292 63 | | |
| Hose, 506 ft., $185.24; couplings, 9, $7.60; expansion rings, 126, $30.40 | 223 24 | | |
| Armature, 1, $206.57; electric lamps, 12, $3.60; sprinklers, 1 set, $50 | 260 17 | | |
| Rakes, 64, $117.05; chain, 50 ft., $2.38; rope, 120 ft., $5.25; leather, 31½ sides, $176.17 | 300 85 | | |
| Paint, 1,159 lbs., $57.15; turps, oil and dryers, 62¼ gals., $34.26 | 91 41 | | |
| *Carried forward* | 1,653 95 | | 203,875 73 |

| | $ c. | $ c. | $ c. |
|---|---|---|---|
| *Brought forward* | 1,653 95 | | 203,875 73 |
| Coal oil, 59 gals., $8.55; machine oil, 5 gals., $5.50; grease, 1,399 lbs., $50.67 | 64 72 | | |
| Graded gutter, 193½ ft., $274.08; cesspools, 4, $24.75; feed boxes, 59, $87.41 | 386 24 | | |
| Axles, spokes, hubs, wheels, springs, shafts, tires, etc. | 89 95 | | |
| Machine lathe (proportion) | 100 00 | | |
| Hair, duck, collar check, tweed | 50 99 | | |
| Pipes and junctions, fire pot, galvanized iron chimney, etc | 37 90 | | |
| Wrenches, knives, pails, metal polish, brooms, etc. | 27 50 | | |
| Vice, rasps, belting, chain shanks and sewing machine | 51 85 | | |
| Locks, butts, screws, horse nails and sundry hardware | 85 86 | | |
| Glass, putty, varnish, acid, tar, glue, coal and wood | 49 65 | | |
| Harness trimmings | 70 70 | | |
| Plumbing at eastern stables | 13 75 | | |
| Horses, 2, $180; horse hire, $179.10; veterinary services, $51.75 | 410 85 | | |
| Horse feed and straw | 10,436 65 | | |
| Rent of 'phones, $67.50; removing night soil, $35 | 102 50 | | |
| Toronto Railway Co., watering tracks | 2,305 71 | | |
| Labor | 9,111 07 | | |
| Water Works (water) | 25,000 00 | | |
| | | 50,049 84 | |
| *Cr.* | | | |
| Paid Treasurer for 2 carts and watering | | 110 00 | |
| | | | 49,939 84 |
| SCAVENGING. | | | |
| Lumber, 73,908 ft., $1,256.04; cedar blocks, 2 cords, $11.18; cedar posts, 34, $7.95 | 1,275 17 | | |
| Nails, 420 lbs., $16.30; iron, 14,707 lbs., $315.39; bolts and washers, 2,835 lbs., $28.45 | 360 14 | | |
| Axles, 20 sets, $187; spokes, 14 sets, $55.50; waggon gear, $65; hubs, 14 sets, $34.63 | 342 13 | | |
| Screws, rivets, nuts, castings and waggon repairs | 23 60 | | |
| Bricks, cement, lime, gravel | 66 20 | | |
| Rasps, forks, augurs, bits, rope and sundry hardware | 176 58 | | |
| Harness, trimmings, horse brushes and nails | 139 93 | | |
| *Carried forward* | 2,383 75 | | 253,815 57 |

| | $ c. | $ c. | $ c. |
|---|---|---|---|
| *Brought forward* | 2,383 75 | | 253,815 57 |
| Castiron pipe, waste pipe, closet and fittings | 91 62 | | |
| Boiled oil, dryers, turps, paint, brushes, glass, putty, etc. | 96 04 | | |
| Coal and wood, $55.47 ; asphalt roofing, 58 bdls., $194.30 | 249 77 | | |
| Electric plant, $66.25 ; rent of 'phones, $27.34 | 93 59 | | |
| Veterinary services, $117.25 ; pasturing 1 horse, $20 | 137 25 | | |
| Horse feed and straw | 2,705 61 | | |
| Labor | 52,531 44 | | |
| | | 58,289 07 | |
| *Cr.* | | | |
| Amount paid Treasurer, horse keep | 761 20 | | |
| " " pound fees | 219 37 | | |
| " " 3 carts | 90 52 | | |
| " " manure | 80 00 | | |
| " " 1 horse | 34 75 | | |
| " " removing garbage | 8 92 | | |
| | | 1,194 76 | |
| | | | 57,094 31 |
| STONE AND WOODEN CROSSINGS. | | | |
| Lumber, 58,939 ft., $804.14 ; cedar blocks, 2½ cords, $14.40 ; cedar posts, 24 ft., 54c. | 819 08 | | |
| Spikes and nails, 1,500 lbs., $46.79 ; sand, gravel, pitch and tar, $78.48 | 125 27 | | |
| Crossing stone, 1,267 ft. 6 in., $457 ; kerb stone, 72 ft. 6 in., $43.50 | 500 50 | | |
| Unloading stone, $4.50 ; freight on stone, $23.48 ; bricks, 2,000, $23.57 | 51 55 | | |
| Scoria blocks, 175, $9.63 ; rent of Sackville St. lot, proportion, $143.57 | 153 20 | | |
| Labor | 1,132 04 | | |
| | | | 2,781 64 |
| STONE AND WOODEN KERBS. | | | |
| Lumber, 19,917 ft., $274.75 ; nails and spikes, 690 lbs., $18.27 | 293 02 | | |
| Cedar kerbing, 2,600 ft., $32.50 ; cedar blocks, 8¾ cords, $54.86 | 87 36 | | |
| Cedar posts, 4½ cords, $24.11 ; gravel, 4 yds., $3.20 ; post hole spoons, 2, 90c. | 28 21 | | |
| Kerb stone, 932 ft. 10 in., $277.58 ; freight on same, $26.96 | 304 54 | | |
| Rent of lot on Sackville St., proportion | 143 56 | | |
| Labor | 1,329 09 | | |
| | | | 2,185 78 |
| *Carried forward* | | | 315,877 30 |

| | $ c. | $ c. | $ c. |
|---|---|---|---|
| *Brought forward* | | | 315,877 30 |
| PRIVATE DRAINS. | | | |
| Pipe, 6-in., 7,588 ft., $669.50; 9-in., 930 ft., $116.25; 12-in., 32 ft., $6.40 | 792 15 | | |
| Bends, junctions, reducers, stoppers and traps, 35 | 10 40 | | |
| Lumber, 1,720 ft., $23.55; cement, 55½ bbls., $120.31 | 143 86 | | |
| Sewer pails, iron, bolts, coal oil, cans and lamps | 14 77 | | |
| Cleaning out cellar on Queen St. east | 7 30 | | |
| Repairing pavements | 71 62 | | |
| Inspection | 1,423 11 | | |
| Labor | 3,920 97 | | |
| | | 6,384 18 | |
| *Cr.* | | | |
| Amount paid Treasurer for private drains. | 7,185 72 | | |
| Less amount of sundry refunds | 698 70 | | |
| | | 6,487 02 | |
| At credit of account | | 102 84 | |
| ASHBRIDGE'S BAY IMPROVEMENT. | | | |
| Lumber, 3,547 ft., $61.49; nails, 115 lbs., $3.52; stone, 48.33 yds., $96.66 | 161 67 | | |
| Boat house, boat hire, tug hire, boat repairs | 117 73 | | |
| Rent of cellar, rubber boots, photos, paint, etc. | 122 40 | | |
| Mounting maps and registering plans | 9 50 | | |
| Expert services, Alan Macdougal | 40 00 | | |
| Inspection, $755.50; labor, $299.60 | 1,055 10 | | |
| Contract work | 31,768 14 | | |
| | | | 33,274 54 |
| DREDGING SEWAGE AT SLIPS. | | | |
| Contract work | 901 12 | | |
| Inspection and advertising | 71 50 | | |
| | | | 972 62 |
| DON RIVER IMPROVEMENT. | | | |
| Labor | 38 93 | | |
| Professional services per C.P.R. | 133 66 | | |
| | | | 172 59 |
| DANFORTH AVENUE IMPROVEMENT. | | | |
| Macadam, 46 loads, $92; 12-in. pipe, 38 ft., $7.60; cement, 2 bbls., $3.82 | 103 42 | | |
| Labor | 396 58 | | |
| | | | 500 00 |
| *Carried forward* | | | 350,797 05 |

| | $ c. | $ c. | $ c. |
|---|---|---|---|
| *Brought forward* | | | 350,797 05 |
| ESPLANADE AGREEMENT. | | | |
| Arbitration fees | 90 00 | | |
| Deputation expenses | 195 00 | | |
| Labor | 19 33 | | |
| Contract work | 587 37 | | |
| | | | 891 70 |
| LEVEL CROSSINGS. | | | |
| Amount paid Grand Trunk Railway Co.: | | | |
| Pape Avenue crossing | 432 42 | | |
| Jones " " | 434 70 | | |
| Logan " " | 443 62 | | |
| Bloor Street " | 335 59 | | |
| Queen " " | 50 57 | | |
| | | 1,696 90 | |
| Amount paid Canadian Pacific Railway Co.: | | | |
| Avenue Road crossing | 425 91 | | |
| Bathurst Street " | 284 52 | | |
| Dufferin " " | 284 47 | | |
| | | 994 90 | |
| | | | 2,691 80 |
| LAKE SHORE ROAD MACADAMIZING. | | | |
| Labor | 44 35 | | |
| | | | 44 35 |
| NEW CITY STABLES. | | | |
| Bricks, 32,000, $212.40; lime, 398 bbls., $138.30; sand, 146 yds., $109.50 | 460 20 | | |
| Lumber, 36,468 ft., $476.51; nails, 1,925 lbs., $92.47; screws, 6 gross, $3.40 | 572 38 | | |
| Eave troughing, $46.97; asphalt roofing, 97 rolls, $324.95 | 371 92 | | |
| Lead pipe, $28.25; sheet lead, $2.40; soil pipe, 59 ft., $18.85; gravel, 16 yds., $12.80 | 62 30 | | |
| Iron, bolts, taps, hangers, hinges and sundry hardware | 66 08 | | |
| Paint, glass, putty, etc. | 33 23 | | |
| | | | 4,232 81 |
| PUBLIC LAVATORY. | | | |
| Excavating, $40; cement, 1 bbl., $2.12; coal oil, 7 gals., $1.19 | 43 31 | | |
| Advertising, $10; repairing pavement, $142.95 | 152 95 | | |
| Strickland & Symons, professional services | 50 00 | | |
| Labor | 64 73 | | |
| | | | 310 99 |
| *Carried forward* | | | 358,968 70 |

| | $ c. | $ c. | $ c. |
|---|---|---|---|
| *Brought forward* | | | 358,968 70 |
| PRINCE OF WALES WALK AND FENCE. | | | |
| Iron pipe, 2,110 ft., $147.70 ; cedar posts, 5½ cords, $30.74 | 178 44 | | |
| Paint, dryers, putty, etc | 22 51 | | |
| Labor | 87 46 | | |
| | | | 288 41 |
| RELIEF SEWERS. | | | |
| Contract work | 1,694 51 | | |
| *Cr.* | | | |
| Amount returned by Pay Master | 44 16 | | |
| | | | 1,650 35 |
| ROSEDALE VALLEY ROAD. | | | |
| Land and damages | 29,300 32 | | |
| Legal expenses, $1,215 ; witness fees, $685 ; copying evidence, $70.85 | 1,970 85 | | |
| Lumber, 26,165 ft., $489.84 ; cedar posts, 18¼ cords, $97.95 ; bricks, 7,000, $41.65 | 629 44 | | |
| Wire nails, 803 lbs., $44.79 ; barb wire, 2,513 ft., $8.23 ; hoop iron, 3,880 ft., $50.42 | 103 44 | | |
| Cement, pipe, manhole steps and sundry hardware | 82 11 | | |
| Paint, oil, turps and brushes | 80 59 | | |
| Advertising, $12 ; hack hire, $4.50 | 16 50 | | |
| Amount paid St. James' Vestry, 3,695 ft. of fence | 1,551 90 | | |
| Contract work | 3,474 82 | | |
| Labor | 3,054 04 | | |
| | | | 40,264 01 |
| SEWER EXTENSION TO WINDMILL LINE. | | | |
| Labor | 151 45 | | |
| Contract | 227 10 | | |
| | | | 378 55 |
| SIDEWALKS AND SEATS ON LAKE SHORE ROAD. | | | |
| Lumber, 39,103 ft., $534.86 ; cedar posts, 322 ft., $58.33 ; nails, 1,500 lbs., $29.85 | 623 54 | | |
| Labor | 326 46 | | |
| | | | 950 00 |
| *Carried forward* | | | 402,500 02 |

| | $ c. | $ c. | $ c. |
|---|---|---|---|
| *Brought forward* | | | 402,500 02 |
| SIDEWALKS AND SEATS, WOODBINE TO KEW BEACH. | | | |
| Lumber, 3,543 ft., $48.82; cedar blocks, ¾ cord, $4.74; nails, 50 lbs., $1.07 | 54 63 | | |
| Labor | 72 91 | | |
| | | | 127 54 |
| STEAM ROAD ROLLER. | | | |
| Lumber, 2,560 ft., $32.77; cedar blocks, ½ cord, $2.90; gravel, 54 yds., $40.50 | 76 17 | | |
| Advertising | 17 20 | | |
| Labor | 363 96 | | |
| Contract price of roller | 3,033 10 | | |
| | | | 3,490 43 |
| RAILWAY PAVEMENTS. | | | |
| Bricks, 11,900, $78.02; sand, 24½ yds., $19.63; cement, 49 bbls., $104.88 | 202 53 | | |
| Lumber, 17,200 ft., $231.20; cedar kerbing, 11,459 ft., $160.42 | 391 62 | | |
| Cedar blocks, 125 cords, $738.17; cedar posts, 87 ft., $18.25; nails and spikes, 800 lbs., $24.80 | 781 22 | | |
| Scoria blocks, 664, $36.52; repairing plough, $3; coal oil, 6½ gals., $1.10 | 40 62 | | |
| Road manhole tops, 8, $62.72; track gully grates, 7, $119.56 | 182 28 | | |
| Manhole steps, 3, 50c.; bends, 24, $4; junctions, 11, $2.75 | 7 25 | | |
| Pipe, 2-in., 262 ft., $3.35; 6-in., 132 ft., $11.22; 9-in., 118 ft., $14.75 | 29 32 | | |
| Labor | 1,813 84 | | |
| Inspection | 582 91 | | |
| Engineering | 5,139 00 | | |
| Contract work | 32,556 89 | | |
| | | | 41,727 48 |
| LOCAL IMPROVEMENT, PAVEMENTS. | | | |
| Bricks, 51,595, $329.47; paving bricks, 8,000, $119.40; old bricks, 1,450, $4.35 | 453 22 | | |
| Cement, 203 bbls., $432.19; sand, 204¾ yds., $153.59; gravel, 112 yds., $89.60 | 675 38 | | |
| Macadam, 182 loads, $364.98; cedar blocks, 3 cords, $16.77 | 381 75 | | |
| Cedar posts, 2, 43c.; cedar kerbing, 75 ft., $1.05; lumber, 10,748 ft., $150.58 | 152 06 | | |
| Nails and spikes, 1,105 lbs., $26.79; kerb stone, 14 ft. 6 in., $8.70 | 35 49 | | |
| Broken granite, 149½ cub. yds., $327.40; coal oil, 41½ gals., $7.06 | 334 46 | | |
| *Carried forward* | 2,032 36 | | 447,845 47 |

| | $ c. | $ c. | $ c. |
|---|---|---|---|
| *Brought forward* | 2,032 36 | | 447,845 47 |
| Pipe, 9-in., 1,033 ft., $129; bends, 27, $6.75; junctions, 2, 50c | 136 25 | | |
| Manhole steps, 58, $9.57; manhole tops, 36, $254.21; manhole covers, 6, $22.14 | 285 92 | | |
| Square culvert tops, 22, $161.42; culvert grates, 1, 99c.; culvert traps, 29, $145 | 307 41 | | |
| Lanterns, 11, $4.40; globes, 6, $1.08; pounders, 1, 21c.; sharpening picks, $12.39 | 18 08 | | |
| Rubber hose, 150 ft., $12.75; nozzle, 1, 75c.; cast iron posts, 2, $6 | 19 50 | | |
| Sod, 5,134 yds., $156.87; moving patrol box, $2; advertising, $33.50 | 192 37 | | |
| Labor | 6,172 77 | | |
| Inspection | 1,639 11 | | |
| Contract work | 83,677 20 | | |
| | | | 94,480 97 |
| LOCAL IMPROVEMENT, SEWERS. | | | |
| Pipe, 12-in., 730 ft., $146; 9-in., 174 ft., $21.75; 6-in., 10 ft., 85c. | 168 60 | | |
| Bends, 9, $2.25; junctions, 23, $10.25; cement, 26 bbls., $56.65 | 69 15 | | |
| Bricks, 8,370, $49.70; old bricks, 400, $1.20; sand, 11 yds., $8.25 | 59 15 | | |
| Manhole steps, 33, $5.45; road manhole tops, 2, $15.68; culvert traps, 9, $45. | 66 13 | | |
| Advertising, $8; coal oil, 1 gal., 17c. | 8 17 | | |
| Labor | 588 69 | | |
| Inspection | 293 04 | | |
| Contract work | 6,948 87 | | |
| | | | 8,201 80 |
| LOCAL IMPROVEMENT, WOODEN SIDEWALKS. | | | |
| 2 and 3-in. plank, 927,816 ft | 12,570 91 | | |
| 4 x 4 scantling, 291,491 ft | 3,764 21 | | |
| Nails, 29,175 lbs | 622 84 | | |
| Water Works charges, moving services | 749 55 | | |
| Hauling lumber to the Island | 5 00 | | |
| Lime, 20 bush | 3 50 | | |
| Wood preservative, 1 bbl | 9 00 | | |
| Labor | 4,353 33 | | |
| | | | 22,078 34 |
| LOCAL IMPROVEMENT, PATENT SIDEWALKS. | | | |
| Labor, sodding boulevards | 80 44 | | |
| Water Works charges, moving services | 386 52 | | |
| Advertising | 15 00 | | |
| Inspection | 669 75 | | |
| Contract work | 13,739 80 | | |
| | | | 14,891 51 |
| *Carried forward* | | | 587,498 09 |

| | $ c. | $ c. | $ c. |
|---|---|---|---|
| *Brought forward* | | | 587,498 09 |
| BRIDGES, OPENINGS AND EXTENSIONS. | | | |
| *Dundas Street Bridges.* | | | |
| Arbitration fees and expert services | 2,151 07 | 2,151 07 | |
| *Tate Street Opening.* | | | |
| Land damages | 1,060 93 | 1,060 93 | |
| *Crawford Street Extension.* | | | |
| Lumber, 8,006 ft., $112.27 ; spikes and nails, 235 lbs., $6.60 | 118 87 | | |
| Gravel, 116 yds., $100.40 ; cement, 1 bbl., $2.24 ; sand, 1½ yds., $1.12 | 103 76 | | |
| Cedar posts, 24, $6 ; 9-in. pipe, 26 ft., $3.25 ; closed manhole cover, 1, $3.15 | 12 40 | | |
| Square manhole tops, 4, $29.12 ; advertising, $4 | 33 12 | | |
| Labor | 249 10 | 517 25 | |
| | | | 3,729 25 |
| Total | | | 591,227 34 |
| Personal and Departmental accounts | | | 46,007 26 |
| | | | 637,234 60 |
| Deduct amount at credit of private drains | | | 102 84 |
| | | | 637,131 76 |

## RAILWAY PAVEMENTS.

| Street. | From | To | Dr. |
|---|---|---|---|
| | | | $ c. |
| Avenue Rd | Bloor | C. P. R | 14,493 05 |
| Broadview Ave | Queen | Danforth | 1,586 13 |
| Bathurst | King | Queen | 183 02 |
| " | Bloor | C. P. R | 612 25 |
| Bloor | Yonge | Dufferin | 2,018 68 |
| " | Dufferin | Lansdowne | 141 38 |
| Church | Front | Bloor | 3,368 83 |
| Dovercourt Rd | College | " | 364 52 |
| Frederick | King | Front | 103 00 |
| Front | Simcoe | Church | 575 58 |
| " | Frederick | " | 20 00 |
| " | " | Sherbourne | 15 11 |
| Gerrard | Parliament | River | 623 16 |
| George | Front | King | 51 59 |
| King | Strachan Ave | Armour | 390 85 |
| " | Sherbourne | Simcoe | 3,660 30 |
| McCaul | Queen | College | 132 60 |
| Queen | River | Davies | 47 75 |
| Ossington Ave | Dundas | College | 9,920 85 |
| Sherbourne | King | Front | 24 23 |
| Station | York and Simcoe | | 3,284 35 |
| Yonge | Front | King | 110 25 |
| Total | | | 41,727 48 |

## LOCAL IMPROVEMENT PAVEMENTS.

| Street. | From | To | Dr. |
|---|---|---|---|
| | | | $ c. |
| ALPHALT : | | | |
| Avenue Rd | Bloor | Davenport | 12,049 44 |
| Bloor | Yonge | Sherbourne | 3,228 14 |
| Jarvis | Queen | Bloor | 1,602 03 |
| Leader Lane | King | Colborne | 933 82 |
| Ontario | Carlton | Howard | 2,771 43 |
| Scott | Front | Colborne | 809 85 |
| Sherbourne | King | Queen | 2,003 88 |
| " | Queen | Bloor | 16,252 01 |
| St. Patrick | Beverley | McCaul | 4,209 27 |
| Victoria | Adelaide | Queen | 7,683 19 |
| BRICK : | | | |
| Amelia | Parliament | Sumach | 7,233 05 |
| Selby | Sherbourne | Huntley | 2,808 90 |
| CONCRETE : | | | |
| Lane e. off Leader La. | Leader Lane | East end | 317 49 |
| " " of Bay | Wellington | Melinda | 564 29 |
| " running e. off lane | East of Bay | | 219 85 |
| CEDAR BLOCK : | | | |
| Argyle | Dundas | Gladstone | 3,740 61 |
| Bloor | Dufferin | Lansdowne | 583 45 |
| Baldwin | Spadina | Beverley | 1,586 89 |
| Carr | Esther | Terminus | 98 71 |
| Davies | Queen | Matilda | 55 65 |
| D'Arcy | McCaul | Spadina | 2,780 38 |
| Euclid Pl. | Euclid | East terminus | 10 00 |
| Huron | Phœbe | Grange | 78 85 |
| Mansfield Ave | Manning | Clinton | 29 60 |
| " | Bellwoods | Grace | 24 85 |
| Northumberland | Ossington | Preston | 25 41 |
| Northcote | Queen | Afton | 2,457 37 |
| Olive Ave | Bathurst | Palmerston | 64 40 |
| Oxford | Spadina | Augusta | 1,067 41 |
| Roseberry Ave | Bathurst | East end | 27 63 |
| Sorauren | Old bound'y, Parkdale | Dundas | 35 59 |
| Sullivan | Spadina | Beverley | 1,629 96 |
| St. Patrick | " | " | 2,592 96 |
| Ulster | Bathurst | Markham | 29 70 |
| Victoria Cr. | Dunn | Jamieson | 126 69 |
| MACADAM : | | | |
| Beverley | Queen | College | 10,227 10 |
| John | King | Front | 1,158 86 |
| Queen's Park Rd | Queen | Northerly | 2,643 15 |
| Sheppard | Adelaide | Richmond | 719 20 |
| | | | 94,480 97 |

## LOCAL IMPROVEMENT SEWERS.

| Street. | From | To | Dr. |
|---|---|---|---|
| | | | $ c. |
| Avenue Rd | Boswell | Pears | 290 11 |
| Hill | South Drive | May | 27 28 |
| Lane n. of Allen Ave. | to north end, rear of | Broadview Ave | 102 30 |
| " | Peter | 259 ft. west | 330 79 |
| May | Hill | Terminus | 35 90 |
| North Crawford | Garrison Ck | Bloor | 324 89 |
| Pears Ave | Avenue Rd | Bedford | 6,117 22 |
| Preston Ave | Northumberland | VanHorne | 413 80 |
| Severn | Severn's Lane | Rosedale Ck | 40 71 |
| Station | 300 ft. w. of York | Simcoe | 518 80 |
| Total | | | 8,201 80 |

## LOCAL IMPROVEMENT SIDEWALKS.

| Street. | Side. | From | To | Dr. |
|---|---|---|---|---|
| WOODEN: | | | | $ c. |
| Arthur | South | Bellwoods | Crawford | 290 95 |
| " | North | Euclid | Manning | 79 63 |
| Argyle | South | Gladstone | Northcote | 85 69 |
| Albert | North | Yonge | James | 126 73 |
| Anderson | Both | Simcoe | East end | 49 21 |
| Adelaide | " | " | York | 412 12 |
| " | South | Church | Francis | 127 02 |
| Amelia | North | Parliament | Sackville | 195 68 |
| Bathurst | West | King | The bridge | 368 80 |
| " | East | Queen | Woolsley | 74 94 |
| Balsam | South | Spadina | Charlotte | 58 48 |
| " | North | " | Huron | 174 91 |
| Bellevue Pl | " | Bellevue | West end | 171 47 |
| Berkeley | West | Wilton Ave | 1st lane north | 31 09 |
| Brunswick Ave | Both | College | Ulster | 309 72 |
| Broadway Pl | South | Spadina | 160 ft. west | 35 40 |
| Bloor | North | Dovercourt Rd | Westmoreland | 56 10 |
| Carlton Ave | South | Ontario | 335 ft. east | 73 04 |
| Carlton | North | Maple | Sumach | 80 70 |
| " | " | 50 ft. e. of Ontario | Parliament | 155 25 |
| Caer Howell | South | Simcoe | The Avenue | 43 30 |
| Cumberland | North | Yonge | Bellair | 174 04 |
| Cummings | " | Bolton | DeGrassi | 41 73 |
| " | South | Wardell | " | 62 92 |
| Church | West | Shuter | Gould | 386 56 |
| " | East | Gloucester | Isabella | 96 43 |
| Charles | " | Yonge | Keiley's livery stable | 144 77 |
| Dale | North | Glen | Maple | 138 72 |
| DeGrassi | West | Queen | 1st avenue | 510 19 |
| " | East | " | Gerrard | 665 65 |
| Defoe | North | Niagara | 147 ft. west | 38 12 |
| " | South | " | Tecumseth | 239 57 |
| Dovercourt | East | Bloor | College | 642 57 |
| Dundas | North | Rusholme | 505 ft. west | 148 32 |
| " | East | 44 ft. n. of Queen | 60 ft. n. of Rebecca | 85 09 |
| Dufferin | " | Dundas | College | 251 63 |
| Duke | North | Jarvis | George | 86 22 |
| " | South | Frederick | Sherbourne | 80 29 |
| Duchess | North | Walker's Lane | " | 34 89 |
| Draper | Both | Wellington | Front | 196 21 |
| Esplanade | North | Scott | West Market | 305 84 |
| Essex | South | Christie | West end | 132 78 |
| Esther | West | Queen | Woolsley | 77 10 |
| Edward | South | Teraulay | Centre | 210 54 |
| First Ave | " | Bolton | DeGrassi | 59 47 |
| *Carried forward* | | | | 7,809 88 |

LOCAL IMPROVEMENT SIDEWALKS—*Continued.*

| Street. | Side. | From | To | Dr. |
|---|---|---|---|---|
| | | | | $ c. |
| *Brought forward.* | | | | 7,809 88 |
| Front | North | Cherry | 296 ft. east | 54 49 |
| " | " | Bathurst | Spadina | 590 37 |
| " | " | Parliament | Trinity | 164 76 |
| " | " | Spadina | Peter | 202 01 |
| Gerrard | South | Jarvis | 1st Lane e. of Yonge | 51 12 |
| George | West | Queen | 193 ft. s. of Wilton A. | 253 32 |
| " | East | " | Wilton Ave | 285 83 |
| Grove | West | Foxley | Dundas | 214 37 |
| " | East | " | " | 241 01 |
| Gwynne | " | Bloor | Bismarck | 65 51 |
| Grant | " | Queen | Clark | 57 93 |
| Glen Rd | West | Howard | The Bridge | 92 28 |
| Gloucester | North | Church | 150 ft. east | 39 91 |
| Grange | South | McCaul | John | 97 25 |
| Grosvenor | " | Surrey Pl | Queen's Park | 73 68 |
| Hayden | " | Church | Yonge | 182 90 |
| Homewood Pl | Both | Wellesley | North end | 53 07 |
| Huron | West | Baldwin | 216 ft. south | 62 66 |
| " | East | St. Patrick | Grange | 95 24 |
| King | North | John | Widmer | 96 60 |
| " | " | Peter | " | 73 25 |
| Lisgar | West | Argyle | Afton | 107 21 |
| Lombard | South | Jarvis | Church | 158 29 |
| Manning | West | Queen | Robinson | 168 42 |
| Munroe | East | Gerrard | Mount Stephen | 152 73 |
| Mutual | East | Queen | Gerrard | 651 60 |
| " | West | Shuter | " | 473 18 |
| McCaul | East | 91½ ft. n. of Queen | N. Richmond Church | 179 51 |
| " | " | 60 ft. n. of Anderson | South side of No. 153 | 92 20 |
| Nassau | North | Augusta | Spadina | 245 85 |
| New | South | Davenport | West end | 53 97½ |
| Nelson | " | 80 ft. e. of John | Simcoe | 238 92 |
| Niagara | " | Bathurst | Portland | 184 01 |
| North Lisgar | West | Dundas | Afton | 241 61 |
| " | East | Shirley | Dundas | 164 14 |
| North Drive | South | Yonge | Rosedale Rd | 116 56 |
| Ontario | East | Queen | Sydenham | 116 28 |
| Ossington Ave | West | Harrison | College | 305 75 |
| Palmerston Ave | East | Robinson | Arthur | 462 96 |
| Parliament | " | Wellesley | Howard | 317 00 |
| Pawnee Ave | " | Lake shore n. to | Island Park | 124 91 |
| Queen | South | 117 ft. e. of Sumach | River | 136 94 |
| " | " | St. Paul | Sackville | 61 80 |
| Reid | " | Sackville | East end | 48 34 |
| Renfrew Pl | " | McCaul | St. Patrick Sq | 21 84 |
| Richmond | North | Berkeley | Victoria | 148 31 |
| *Carried forward.* | | | | 15,829 77 |

LOCAL IMPROVEMENT SIDEWALKS—*Continued.*

| Street. | Side. | From | To | Dr. |
|---|---|---|---|---|
| | | | | $ c. |
| *Brought forward* | | | | 15,829 77 |
| Richmond | South | John | Widmer | 79 72 |
| " | North | " | Duncan | 119 06 |
| River | East | Queen | Wilton Ave. | 348 48 |
| Robinson | South | Manning | Bellwoods | 202 71 |
| Sackville | East | Queen | St. David's | 210 85 |
| Simcoe | " | " | Caer Howell | 503 69 |
| Sumach | West | Carlton | Winchester | 128 30 |
| Surry Pl. | East | Grosvenor | St. Alban's | 163 51 |
| Scollard | North | Yonge | 171 ft. west | 37 10 |
| Spadina Ave. | West | Queen | Adelaide | 195 52 |
| Spencer Ave. | East | King | 804 ft. south | 235 18 |
| " | West | " | 894 ft. south | 252 66 |
| Sherbourne | " | " | Front | 74 52 |
| Station | North | York | Simcoe | 234 90 |
| Stephanie Pl | " | John | Beverley | 46 05 |
| Spruce | " | Sackville | Gifford | 53 71 |
| St. Andrew's | North | Kensington | Spadina | 150 26 |
| St. Clarens | West | Dundas | South end | 347 33 |
| St. Patrick | North | Bathurst | Carlisle | 105 64 |
| St. Thomas | East | Czar | Bloor | 119 06 |
| " | West | Sultan | " | 56 44 |
| Tate | South | Water | Beachall | 76 68 |
| Temperance | " | Yonge | Bay | 166 00 |
| Trefann | West | Queen | Robert Pl. | 51 62 |
| " | East | " | 1st La. s. of Syd'nh'm | 60 18 |
| Victoria | West | Gould | Gerrard | 188 86 |
| Walton | South | Yonge | Teraulay | 195 09 |
| Wellesley | " | Church | Yonge | 255 61 |
| Wellington | " | Bathurst | Tecumseth | 273 28 |
| " Ave | North | 50 ft. e. of Niagara | " | 64 82 |
| " Pl. | South | Spadina | Portland | 406 07 |
| Wilton Ave | North | Ontario | Berkeley | 82 31 |
| " | South | Berkeley | Parliament | 91 08 |
| " | North | Mutual | Jarvis | 70 82 |
| " | South | Yonge | " | 363 02 |
| " | North | Church | 1st Lane west | 46 42 |
| Winchester | " | Ontario | Rose Ave | 83 32 |
| " | South | Metcalf | Sackville | 108 70 |
| | | | Total | 22,078 34 |

PATENT SIDEWALKS.

| Street. | Side. | From | To | Dr. |
|---|---|---|---|---|
| | | | | $ c. |
| Adelaide | North | Post Office La | Victoria | 554 66 |
| " | " | Yonge | Bay | 1,722 85 |
| Bloor | South | St. George | 198 ft. east | 244 06 |
| Carlton | " | Sherbourne | Seaton | 40 05 |
| Church | West | 163ft.n.ofWell'ng'n | King | 511 17 |
| Front | South | Simcoe | 50 ft. east | 11 78 |
| " | " | in front of Union | Station | 374 04 |
| Isabella | Both | Jarvis | Sherbourne | 1,538 66 |
| King | North | York | Simcoe | 137 60 |
| Leader Lane | Both | King | Colborne | 341 51 |
| Lombard | North | 88 ft. e. of Victoria | Church | 1,055 46 |
| Queen east | " | Yonge | Berkeley | 857 59 |
| Queen west | " | Dundas | Dovercourt | 110 04 |
| St. George | East | Hoskin | Bloor | 1,388 17 |
| Sherbourne | " | Queen | McCormack's prop'y | 30 15 |
| " | " | Wellesley | Howard | 1,472 09 |
| Wellesley | South | Church | Jarvis | 69 46 |
| Yonge | East | Maitland | Bloor | 4,432 17 |
| | | | Total | 14,891 51 |

BRIDGES, OPENINGS AND EXTENSIONS.

| Works. | Dr. |
|---|---|
| | $ c. |
| Dundas Street Bridges | 2,151 07 |
| Tate Street opening | 1,060 93 |
| Crawford Street extension | 517 25 |
| Total | 3,729 25 |

# APPENDIX "B."

## WATER WORKS DEPARTMENT.

## SCHEDULE No. 1.

### Cash Expenditure on Maintenance Account.

| | On account of 1895. | On account of 1894. Liabilities. | Total. | |
|---|---|---|---|---|
| | $ c. | $ c. | $ c. | $ c. |
| Machine shop and meters.. | 9,538 72 | 3 19 | 9,541 91 | |
| Maintenance of distribution | 19,601 34 | 48 04 | 19,649 38 | |
| Main pumping station .... | 75,502 63 | ..... | 75,502 63 | |
| Reservoir ..... | 11,064 50 | 3 40 | 11,067 90 | |
| High level station..... | 9,959 14 | 6 72 | 9,965 86 | |
| Press and store house .... | 6,783 49 | ..... | 6,783 49 | |
| Office ..... ..... | 2,639 48 | 8 50 | 2,647 98 | |
| Cartage ..... | 3,470 36 | 48 58 | 3,518 94 | |
| Insurance, damages, miscellaneous and rentals .. | 2,630 59 | ..... | 2,630 59 | |
| Contingencies ..... | 1,787 60 | ..... | 1,787 60 | |
| General stores ..... | 15 42 | ..... | 15 42 | |
| Total ordinary maintenance | 142,993 27 | 118 43 | 143,111 70 | 143,111 70 |
| Special repairs : | | | | |
| Painting engine house .. | 535 25 | ..... | 535 25 | |
| Repairs to Nos. 1, 2 and 3 engines..... | 764 45 | ..... | 764 45 | |
| Painting engines ..... | 104 00 | ..... | 104 00 | |
| Total special maintenance. | 1,403 70 | ..... | 1,403 70 | 1,403 70 |
| Total of expenditure on maintenance account ..... | | ..... | | 144,515 40 |

CASH EXPENDITURE ON CONSTRUCTION ACCOUNT, 1895.

| | On account of 1895. | On account of 1894. Liabilities. | Total. | | |
|---|---|---|---|---|---|
| | $ c. | $ c. | $ c. | $ | c. |
| House services | 5,300 23 | | 5,300 23 | | |
| New engines | 4,947 48 | 1,277 25 | 6,224 73 | | |
| Connecting dead ends | 1,455 77 | | 1,455 77 | | |
| Short lengths | 4,211 40 | 28 14 | 4,239 54 | | |
| Boring test holes for tunnel | 5,108 53 | | 5,108 53 | | |
| Extension of 30-inch pumping main | | 69 33 | 69 33 | | |
| Concreting portion of bottom of reservoir | 1,503 66 | 62 62 | 1,566 28 | | |
| 12-inch discharge pipe for reservoir | 2,015 00 | | 2,015 00 | | |
| Special connections and valve chambers | | 25 04 | 25 04 | | |
| New water meters | 3,495 00 | | 3,495 00 | | |
| Connection between pumping wells | 2,287 81 | | 2,287 81 | | |
| New water supply | 5,164 58 | | 5,164 58 | | |
| Hose reel house and hose at main pumping station | 458 00 | | 458 00 | | |
| Steam pipe connection between old and new engine houses | 117 95 | | 117 95 | | |
| Changing furnaces of Nos. 4 and 5 boilers to down draught system | 2,081 78 | | 2,081 78 | | |
| Pipe laying revenue | 1,254 87 | | 1,254 87 | | |
| Anchoring conduit | 3,254 83 | | 3,254 83 | | |
| | 42,656 89 | 1,462 38 | 44,119 27 | 44,119 | 27 |

CASH EXPENDITURE ON RENEWAL ACCOUNT, 1895.

| | On account of 1895. | On account of 1894. Liabilities. | Total. | |
|---|---|---|---|---|
| | $ c. | $ c. | $ c. | $ c. |
| House service renewals .. | 1,463 41 | ..... | 1,463 41 | |
| Relaying intake pipe .... | 1,428 55 | ..... | 1,428 55 | |
| Renewal of water mains .. | 3,670 43 | ..... | 3,670 43 | |
| Altering position of mains under Grand Trunk Railway tracks south of Front Street ..... ..... | 3,148 49 | ..... | 3,148 49 | |
| Rebuilding well at old engine house ..... | 2,299 54 | ..... | 2,299 54 | |
| Changing discharge pipe for Nos. 1, 2 and 3 engines ..... | 359 71 | ..... | 359 71 | |
| Examination and inspection of conduit ..... | 2,119 23 | ..... | 2,119 23 | |
| Repairs to conduit ..... | 15,780 77 | 481 66 | 16,262 43 | |
| Distributing water ..... | 12,103 36 | ..... | 12,103 36 | |
| Constructing basin on Isl'd | 5,151 22 | ..... | 5,151 22 | |
| | 47,524 71 | 481 66 | 48,006 37 | 48,006 37 |

SUMMARY OF EXPENDITURE.

| | |
|---|---|
| Maintenance ..... | $144,515 40 |
| Construction ..... | 44,119 27 |
| Renewals ..... | 48,006 37 |
| Total expenditure for Water Works purposes .... | $236,641 04 |

SCHEDULE No. 2.

STATEMENT OF WATER PUMPED BY ENGINES NOS. 1, 2 AND 3 FOR THE YEAR 1895.

| Month | No. of Days on which Engines working. | | | Number of Hours working each Month. | | | Number of Strokes for each Engine per Month. | | | Quantity of Water Pumped per Month by each Engine in Imp. Gals.—Gross. | | | Total Quantity Pumped by Nos. 1, 2 and 3 Engines in Imperial Gallons—Gross. | Percentage of Slip. | Total Quantity Pumped in Imperial Gallons—Net. | Average Pressure on Pumps. | Average Level of Water in Well below Zero. | Total Quantity of Coal Consumed per Month by Nos. 1, 2 and 3 Engines. | | Coal Consumed while Banking Fires, etc. | | Coal Consumed while Pumping. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. 1. | No. 2. | No. 3. | No. 1. | No. 2. | No. 3. | No. 1. | No. 2. | No. 3. | No. 1. | No. 2. | No. 3. | | | | | | | | | | | |
| | | | | h. m. | h. m. | h. m | | | | | | | | | | | Feet. | Tons. | Lbs. | Tons. | Lbs. | Tons. | Lbs. |
| January | 16 | 26 | ..... | 169 0 | 558 10 | ..... | 126,353 | 389,714 | ..... | 28,808,484 | 178,892,496 | ..... | 207,700,980 | 6 | 195,238,922 | 95.5 | 4.91 | 625 | 1,825 | 80 | 370 | 545 | 1,455 |
| February | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 99 | 1,500 | 99 | 1,500 | ..... | ..... |
| March | 8 | 9 | ..... | 118 45 | 171 05 | ..... | 94,877 | 119,165 | ..... | 21,631,956 | 54,696,735 | ..... | 76,328,691 | 6 | 71,718,970 | 96.25 | 6.08 | 300 | 1,700 | 93 | 1,300 | 207 | 400 |
| April | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 54 | 000 | 54 | 000 | ..... | ..... |
| May | 3 | 3 | 2 | 16 30 | 14 40 | 4 40 | 13,529 | 10,990 | 2,561 | 3,084,612 | 5,014,410 | 1,244,646 | 9,373,668 | 6 | 8,811,248 | 96.00 | 4.88 | 127 | 220 | 61 | 000 | 66 | 220 |
| June | ..... | 23 | 20 | ..... | 299 8 | 409 00 | ..... | 189,516 | 292,831 | ..... | 86,987,844 | 142,315,866 | 229,303,710 | 6 | 215,545,487 | 95.63 | 5.90 | 610 | 380 | 56 | 1,000 | 553 | 1,380 |
| July | ..... | 5 | ..... | ..... | 31 25 | ..... | ..... | 18,861 | ..... | ..... | 8,657,199 | ..... | 8,657,199 | 6 | 8,137,767 | 97.03 | 5.48 | 85 | 089 | 30 | 000 | 55 | 089 |
| August | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 94.68 | 5.29 | 10 | 510 | 10 | 510 | ..... | ..... |
| September | 19 | 1 | ..... | 142 20 | 14 10 | ..... | 107,845 | 8,073 | ..... | 21,588,660 | 3,705,507 | ..... | 28,294,167 | 6 | 26,596,517 | 91.86 | 3.86 | 93 | 1,450 | ..... | ..... | 93 | 1,450 |
| October | 25 | 25 | ..... | 281 35 | 366 45 | ..... | 206,270 | 360,539 | ..... | 47,029,560 | 165,487,401 | ..... | 212,516,961 | 6 | 199,765,943 | 92.93 | 5 21 | 607 | 030 | 12 | 000 | 595 | 030 |
| November | 24 | 23 | .... | 334 05 | 507 10 | ..... | 225,283 | 301,631 | ..... | 51,364,524 | 138,448,629 | ..... | 189,813,153 | 6 | 178,421,364 | 91.06 | 5.54 | 530 | 1,540 | 28 | 000 | 502 | 1,540 |
| December | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 6 | 000 | 6 | 000 | ..... | ..... |
| Totals | 95 | 115 | 22 | 1,062 15 | 2,162 33 | 413 40 | 774,157 | 1,398,519 | 295,392 | 176,507,796 | 641,920,221 | 143,560,512 | 961,988,529 | 6 | 904,269,218 | 853.94 | 47.13 | 3,150 | 1,244 | 531 | 680 | 2,619 | 564 |
| Monthly Average | 7.9 | 9.58 | 1.83 | 88 31 | 180 13 | 34 28 | 64,513 | 116,543 | 24,616 | 14,708,983 | 53,493,351 | 11,963,376 | 80,165,710 | 6 | 75,355,768 | 91.88 | 5.24 | 262 | 1,104 | 44 | 556 | 218 | 547 |
| Daily Average | ..... | ..... | ..... | 2 54 | 5 55 | 1 8 | 2,121 | 3,831 | 809 | 483,583 | 1,758,685 | 393,316 | 2,635,584 | ..... | 2,477,450 | 94 88 | 5.24 | 8 | 1,264 | 1 | 912 | 7 | 352 |

Duty performed by engines = 40,817,369 foot pounds per 100 pounds of coal consumed while pumping.
Water pumped per pound of coal consumed while pumping = 172 imperial gallons.
Pounds of coal consumed while pumping per 1,000 imperial gallons = 5.793 lbs.

SCHEDULE No. 3.

STATEMENT OF WATER PUMPED BY ENGINES NOS. 4 AND 5 FOR THE YEAR 19

| Month. | No. of Days on which Engines working. | | Number of Hours working each Month. | | Number of Strokes made by Engines each Month. | | Quantity of Water Pumped each Month by each Engine—Imperial Gallons—Gross. | | Total Quantity Pumped by Nos. 4 and 5 Engines—Imperial Gallons—Gross. | Percentage of Slip. | Total Quantity Pumped Imperial Gallons—Net. | Average Pressure on Pumps. | Average Lift by Engines. | Total Quantity of Coal used under Boilers each Month. | Coal Consumed for Banking Fires. | Coal Consumed while Pumping. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. 4. | No. 5. | No. 4. | No. 5. | No. 4. | No. 5. | No. 4. | No. 5. | | | | | | | | |
| | | | h. m. | h. m. | | | | | | | | Pounds. | Feet. | Tons. Lbs. | Tons. Lbs. | Tons. Lbs. |
| January | 7 | 31 | 63 35 | 715 15 | 124,063 | 1,510,583 | 26,177,293 | 317,222,430 | 343,399,723 | 4 | 329,663,734 | 94.15 | 21.02 | 418 315 | 15 1,500 | 402 815 |
| February | 28 | 28 | 644 15 | 666 10 | 1,276,570 | 1,400,060 | 269,356,270 | 294,012,600 | 563,368,870 | 4 | 540,834,116 | 97.09 | 20.08 | 643 1,830 | 18 1,000 | 625 830 |
| March | 25 | 31 | 542 15 | 735 25 | 1,046,491 | 1,543,228 | 220,809,601 | 324,077,880 | 544,887,481 | 4 | 523,091,981 | 96.33 | 20.26 | 635 190 | 24 1,800 | 610 390 |
| April | 30 | 30 | 624 45 | 690 55 | 1,189,199 | 1,412,312 | 250,920,989 | 296,585,520 | 547,506,509 | 4 | 525,606,249 | 96.00 | 19.60 | 650 990 | 15 1,500 | 634 1,490 |
| May | 31 | 31 | 631 0 | 728 5 | 1,180,052 | 1,486,851 | 248,990,972 | 312,238,710 | 561,229,682 | 4 | 538,780,495 | 96.03 | 19.05 | 678 1,870 | 9 1,000 | 669 870 |
| June | 14 | 29 | 308 0 | 688 35 | 597,938 | 1,463,449 | 126,164,918 | 307,324,290 | 433,489,208 | 4 | 416,149,640 | 95.63 | 19.66 | 528 1,630 | 13 1,000 | 515 630 |
| July | 31 | 31 | 717 20 | 734 20 | 1,389,495 | 1,498,230 | 293,183,445 | 314,628,300 | 607,811,745 | 4 | 583,499,275 | 97.03 | 19.64 | 748 090 | 9 1,000 | 738 1,090 |
| August | 29 | 31 | 636 30 | 677 55 | 1,315,615 | 1,380,740 | 277,594,765 | 289,955,400 | 567,550,165 | 4 | 544,848,158 | 94.68 | 19.65 | 713 1,810 | 36 1,180 | 677 630 |
| September | 30 | 30 | 638 30 | 632 45 | 1,223,765 | 1,134,192 | 258,214,415 | 238,180,320 | 496,394,735 | 4 | 476,538,945 | 91.87 | 17.63 | 661 910 | 57 00 | 604 910 |
| October | 13 | 28 | 249 35 | 645 55 | 484,453 | 1,314,017 | 102,219,583 | 275,943,570 | 378,163,153 | 4 | 363,036,627 | 92.93 | 18.64 | 516 1,490 | 48 00 | 468 1,490 |
| November | 21 | 20 | 470 55 | 418 5 | 936,272 | 833,091 | 197,553,392 | 174,949,110 | 372,502,502 | 4 | 357,602,402 | 94.06 | 19.46 | 494 680 | 64 1,000 | 429 1,680 |
| December | 31 | 31 | 688 8 | 693 20 | 1,301,285 | 1,350,055 | 274,571,135 | 283,511,550 | 558,082,685 | 4 | 535,759,378 | 94.48 | 19.79 | 748 1,830 | 71 1,000 | 677 830 |
| Totals | 290 | 351 | 6,214 48 | 8,026 45 | 12,065,198 | 16,326,808 | 2,545,756,778 | 3,428,629,680 | 5,974,386,458 | 4 | 5,735,411,000 | 1,140.58 | 234.48 | 7,438 1,635 | 384 1,980 | 7,053 1,655 |
| Monthly Averages | 24.166 | 29 25 | 517 54 | 668 54 | 1,005,433 | 1,360,567 | 212,146,398 | 285,719,140 | 497,865,538 | 4 | 477,950,916 | 95 05 | 19.54 | 619 1,803 | 32 165 | 587 1,971 |
| Daily Averages | | | 17 1 | 21 59 | 33,055 | 44,731 | 6,974,676 | 9,393,506 | 16,368,182 | 4 | 15,713,454 | 95.05 | 19.54 | 20 761 | .... 176 | 19 651 |

Duty performed by engines = 97,091,320 foot pounds per 100 lbs. of coal consumed while pumping.
Water pumped per pound of coal consumed while pumping = 406 imperial gallons.
Coal consumed while pumping per 1,000 gallons = 2.459 pounds.

SCHEDULE No. 4.

RECORD OF WATER RE-PUMPED AT HIGH LEVEL STATION FOR THE YEAR 1895.

| Month. | Number of Hours Engines Working. | | Number of Revolutions made by Pumps. | | Quantity of Water Re-Pumped. | | Total Quantity of Water Re Pumped by both Engines in Imperial Gallons. | Percentage of Slip. | Net Quantity of Water Re-Pumped in Imperial Gallons. | Average Pressure on Force Mains. | Average Pressure on Suction Main. | Total Quantity of Coal Consumed under Boilers. | Coal Consumed for Banking Fires, Raising Steam, Etc. | Coal Consumed while Pumping. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. 1. | No. 2. | No. 1. | No. 2. | No. 1. | No. 2. | | | | | | | | |
| | h. m. | h. m. | | | | | | | | | | Tons. Lbs. | Tons. Lbs. | Tons. Lbs. |
| January | 496 00 | 465 30 | 961,274 | 1,322,849 | 45,756,641 | 62,967,612 | 108,724,253 | 2 | 106,549,768 | 52.47 | 16.70 | 96 100 | 9 600 | 86 1,800 |
| February | 415 45 | 330 30 | 962,426 | 891,852 | 45,811,474 | 42,594,954 | 88,406,428 | 2 | 86,638,299 | 54.68 | 17.30 | 84 1,200 | 8 1,400 | 75 1,800 |
| March | 491 42 | 445 30 | 899,698 | 1,123,547 | 42,825,616 | 53,480,835 | 96,306,451 | 2 | 94,380,322 | 52.26 | 17.41 | 93 800 | 10 400 | 83 400 |
| April | 478 00 | 451 30 | 808,805 | 1,163,149 | 38,499,115 | 55,365,890 | 93,865,005 | 2 | 91,987,705 | 52.21 | 17.02 | 86 1,000 | 9 000 | 77 1,000 |
| May | 496 00 | 445 50 | 882,764 | 1,177,856 | 42,019,560 | 56,065,945 | 98,085,505 | 2 | 96,123,795 | 52.97 | 16.88 | 89 200 | 9 1,2 0 | 79 1,000 |
| June | 480 00 | 429 30 | 938,078 | 1,128,332 | 44,652,516 | 53,708,603 | 98,361,119 | 2 | 96,393,897 | 52.31 | 16.99 | 83 1,600 | 9 600 | 74 1,000 |
| July | 496 00 | 427 30 | 999,559 | 1,124,544 | 47,579,006 | 53,528,293 | 101,107,299 | 2 | 99,085,153 | 52.16 | 16.87 | 85 1,800 | 9 1,200 | 76 600 |
| August | 496 00 | 422 00 | 992,807 | 1,055,919 | 47,257,612 | 50,261,743 | 97,519,355 | 2 | 95,568,968 | 51.9 | 16.73 | 83 1,200 | 9 1,200 | 74 000 |
| September | 475 00 | 431 30 | 968,026 | 1,049,038 | 46,078,037 | 49,934,210 | 96,012,247 | 2 | 94,092,003 | 52.49 | 13.53 | 85 1,200 | 9 000 | 76 1,200 |
| October | 496 00 | 425 40 | 1,056,929 | 1,088,271 | 50,309,823 | 51,801,698 | 102,111,521 | 2 | 100,069,291 | 52.62 | 13.64 | 95 200 | 9 1,800 | 85 400 |
| November | 480 00 | 419 00 | 1,022,406 | 1,090,387 | 48,666,525 | 51,902,421 | 100,568,946 | 2 | 98,557,567 | 52.71 | 16.27 | 87 200 | 9 600 | 77 1,600 |
| December | 498 30 | 459 00 | 1,005,280 | 1,201,336 | 47,851,328 | 57,183,598 | 105,034,926 | 2 | 102,934,228 | 52.21 | 16.20 | 89 1,000 | 9 1,200 | 79 1,800 |
| Totals | 5,798 57 | 5,253 00 | 11,498,052 | 13,420,080 | 547,307,253 | 668,795,802 | 1,186,103,055 | 2 | 1,162,380,996 | 631.02 | 195.54 | 1,060 800 | 113 200 | 947 600 |
| Monthly Averages | 483 15 | 437 45 | 958,171 | 1,118,340 | 45,608,938 | 53,232,983 | 98,811,921 | 2 | 96,865,083 | 52.58 | 16.29 | 88 733 | 9 850 | 78 1,883 |
| Daily Averages | 15 53 | 14 23 | 31,501 | 36,767 | 1,499,472 | 1,750,127 | 3,249,597 | 2 | 3,184,605 | 52.58 | 16.29 | 2 1,810 | .. 619 | 2 1,191 |

## SCHEDULE No. 5.

RECORD OF GAUGING AT ROSEHILL RESERVOIR FOR EACH MONTH OF 1895.

| Month. | Elevation of Lowest Water above Zero. | Elevation of Highest Water above Zero. | Average Elevation above Zero. | Average Depth in Reservoir. | Average Contents in Imperial Gallons. |
|---|---|---|---|---|---|
| | Ft. In. | Ft. In. | Ft. In. | Ft. In. | |
| January | 209 6 | 216 1 | 213 8 | 17 8 | 27,080,047 |
| February | 211 11 | 216 0 | 213 10 | 17 10 | 27,494,764 |
| March | 214 0 | 216 0 | 215 4 | 19 4 | 31,456,018 |
| April | 214 0 | 216 1½ | 215 3 | 19 3 | 31,203,821 |
| May | 214 0 | 216 0 | 215 3 | 19 3 | 31,203,821 |
| June | 213 4 | 216 4 | 215 2 | 19 2 | 30,951,624 |
| July | 213 8 | 216 4 | 215 2 | 19 2 | 30,951,624 |
| August | 210 1 | 216 6 | 215 1 | 19 1 | 30,699,427 |
| September (6 days) | 211 11 | 216 1 | 213 9 | 17 9 | 27,287,406 |
| October | .. .. | .. .. | .. .. | .. .. | ..... |
| November | 211 10 | 216 2 | 214 6 | 18 6 | 29,178,356 |
| December | 213 0 | 216 5 | 214 8 | 18 8 | 29,601,314 |
| Averages | ..... | ..... | 214 8 | 18 8 | 29,737,111 |

NOTE.—The returns from 7th September to 31st October, inclusive, are omitted from this Schedule, the reservoir being empty between those dates.

The average depth of water in the Reservoir for the year (excluding above period when Reservoir was empty on account of the rising of the conduit) was 18 ft. 8 in. equal to an average elevation of 214 ft. 8 in. above zero.

## SCHEDULE No. 6.

COMPARATIVE STATEMENT SHOWING NUMBER OF GALLONS PUMPED, QUANTITY AND COST OF FUEL, ETC., FROM 1876 TO 1895.

| YEAR. | Total Water Pumped — Imp. Gals. | Quantity of Fuel. | Total Cost of Fuel. | Average Daily Quantity of Water Pumped — Imp. Gals. | Average Daily Consumption of Coal. | Water Pumped per Pound of Fuel. — Imp. Gals. |
|---|---|---|---|---|---|---|
| | | Lbs. | $ c. | | Lbs. | |
| 1876 | 1,625,139,876 | 6,998,282 | 19,645 75 | 4,451,202 | 19,093 | 232.55 |
| 1877 | 2,633,433,932 | 10,407,992 | 25,556 29 | 7,214,887 | 28,515 | 253.02 |
| 1878 | 1,417,370,918 | 8,120,000 | 15,196 20 | 3,883,208 | 22,246 | 174.55 |
| 1879 | 1,610,104,542 | 10,872,211 | 19,313 07 | 4,411,245 | 29,787 | 148.09 |
| 1880 | 1,785,859,706 | 11,694,808 | 28,455 72 | 4,879,422 | 31,953 | 152.17 |
| 1881 | 1,910,430,419 | 12,391,874 | 31,410 04 | 5,234,056 | 33,950 | 154.18 |
| 1882 | 2,108,933,115 | 11,685,556 | 30,170 64 | 5,777,899 | 32,015 | 180.47 |
| 1883 | 2,809,956,484 | 17,266,679 | 43,529 08 | 7,698,511 | 47,306 | 162.74 |
| 1884 | 3,645,442,082 | 19,920,782 | 52,525 56 | 9,960,224 | 54,428 | 183.00 |
| 1885 | 3,537,482,598 | 18,644,465 | 46,589 27 | 9,691,733 | 51,081 | 189.73 |
| 1886 | 4,134,376,998 | 19,285,371 | 41,979 32 | 11,327,060 | 52,837 | 214.37 |
| 1887 | 4,417,938,169 | 23,283,900 | 50,051 85 | 12,103,940 | 63,791 | 189.74 |
| 1888 | 4,041,964,514 | 20,457,935 | 46,600 77 | 11,073,875 | 56,049 | 197.57 |
| 1889 | 4,148,781,634 | 19,231,940 | 44,135 10 | 11,366,525 | 52,690 | 215.72 |
| 1890 | 5,249,760,226 | 24,615,830 | 56,239 99 | 14,382,904 | 67,536 | 212.96 |
| 1891 | 6,207,656,403 | 29,300,240 | 60,012 77 | 17,007,275 | 80,291 | 211 86 |
| 1892 | 6,659,925,650 | 34,505,875 | 71,805 25 | 18,246,371 | 94,278 | 193.00 |
| 1893 | 6,646,021,488 | 26,013,840 | 64,702 86 | 18,208,278 | 71,270 | 255.47 |
| 1894 | 6,589,492,142 | 26,822,145 | 54,902 85 | 18,053,403 | 73,485 | 245.67* |
| 1895 | 6,639,680,218 | 21,178,879 | 40,221 85 | 18,190,902 | 58,024 | 313.5 |

* A larger percentage was allowed for slip in 1894 and 1895 than in 1893 and previous years.

## SCHEDULE No. 7.

QUANTITY OF WATER PUMPED AND QUANTITY CONSUMED DURING EACH MONTH OF 1895, WITH AMOUNT OF DAILY CONSUMPTION.

| MONTH. | Total quantity Pumped per month in Imperial Gallons. | Quantity stored in Reservoir at end of each month. Imp. Gallons. | Quantity consumed during each month. Imperial Gallons. | Average daily consumption of water. Imperial Gallons. | Average daily consumption of coal at Main Pump. Station. | |
|---|---|---|---|---|---|---|
| | | | | | Tons. | Lbs. |
| Stored in Reservoir on 31st December, 1894 | ..... | 28,966,876 | ..... | ..... | ..... | ..... |
| January | 524,902,656 | 29,178,356 | 524,691,176 | 16,925,522 | 33 | 1,359 |
| February | 540,834,116 | 30,235,751 | 539,776,721 | 19,277,740 | 26 | 1,119 |
| March | 594,810,954 | 31,203,821 | 593,872,881 | 19,157,189 | 30 | 383 |
| April | 525,606,249 | 31,456,018 | 525,354,052 | 17,511,802 | 23 | 966 |
| May | 547,591,743 | 30,447,239 | 548,600,531 | 17,696,791 | 26 | 003 |
| June | 631,695,127 | 30,951,624 | 631,190,733 | 21,039,691 | 37 | 1,934 |
| July | 591,637,042 | 33,978,000 | 588,610,666 | 18,987,440 | 26 | 1,747 |
| August | 544,818,158 | 25,014,627 | 553,811,531 | 17,864,888 | 23 | 720 |
| September | 503,135,462 | ..... | 528,150,089 | 17,605,003 | 25 | 345 |
| October | 562,802,570 | 23,185,137 | 539,617,433 | 17,407,014 | 36 | 500 |
| November | 536,026,766 | 32,464,808 | 526,747,095 | 17,558,236 | 34 | 340 |
| December | 535,759,378 | 28,543,918 | 539,680,268 | 17,409,041 | 24 | 704 |
| Totals | 6,639,680,218 | ..... | 6,640,103,176 | ..... | ..... | ..... |
| Averages | ..... | ..... | 18,192,063 | 18,192,063 | 29 | 024 |

## SCHEDULE No. 8.

COMPARATIVE STATEMENT SHOWING INCREASE OF DEPARTMENT YEARLY, 1875 TO 1895 INCLUSIVE.

| YEAR. | Average Daily Consumption of Water. | Population. | Average Daily Consumption of Water per Capita for all Purposes. | Total Number of House Services in use in each year. | Number of House Services put in each year. | Total Number of Hoists in use each year. | Total Number of Meters in use each year. | Total Number of Miles of Mains in use each year. | Average Pressure on Pumps. | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | No. 1, Worthington Engine. | No. 2, Worthington Engine. | No. 3, Inglis & Hunter. | No. 4, Blake Engine. | No. 5, Blake Engine. |
| | | | Gallons. | | | | | Miles. | | | | | |
| 1875 ..... | 3,424,000 | 68,678 | 49.86 | 2,769 | 842 | ..... | ..... | 49.810 | 88.10 | ..... | ..... | ..... | ..... |
| 1876 ..... | 4,451,202 | 71,693 | 62.09 | 3,512 | 740 | ..... | ..... | 80 250 | 88.78 | 97.51 | ..... | ..... | ..... |
| 1877 ..... | 2,812,000 | 67,386 | 41.74 | 4,518 | 1,006 | ..... | ..... | 107 570 | 83.33 | 97 69 | ..... | ..... | ..... |
| 1878 ..... | 3,883,208 | 70,867 | 54.79 | 6,707 | 2,189 | 28 | ..... | 110.240 | 89.65 | 96 64 | ..... | ..... | ..... |
| 1879 ..... | 4,411,245 | 73,813 | 59.76 | 8,568 | 1,861 | 47 | ..... | 111.290 | 95.28 | 99.04 | ..... | ..... | ..... |
| 1880 ..... | 4,879,422 | 75,110 | 64.96 | 9,582 | 1,014 | 66 | ..... | 113.312 | 98.22 | 99.52 | ..... | ..... | ..... |
| 1881 ..... | 5,234,056 | 76,934 | 68.03 | 12,236 | 2,654 | 79 | ..... | 115.518 | 96.32 | 100.78 | ..... | ..... | ..... |
| 1882 ..... | 5,777,899 | 81,372 | 71.01 | 14,062 | 1,826 | 94 | ..... | 116.145 | 94.85 | 101.66 | ..... | ..... | ..... |
| 1883 ..... | 7,698,511 | 91,796 | 83.87 | 16,276 | (1,766) (448) | 109 | ..... | 131.352 | 94.27 | 106.49 | ..... | ..... | ..... |
| 1884 ..... | 9,960,224 | 105,211 | 94.66 | 18,363 | 2,087 | 130 | ..... | 138.301 | 99.146 | 107.036 | ..... | ..... | ..... |
| 1885 ..... | 9,706,127 | 111,800 | 86.82 | 20,707 | 2,344 | 140 | 195 | 143.257 | 98.84 | 106.45 | 103.88 | ..... | ..... |
| 1886 ..... | 11,344,337 | 118,403 | 95.81 | 23,643 | 2,936 | 152 | 256 | 156.042 | 104.88 | 104.92 | 101.67 | ..... | ..... |
| 1887 ..... | 12,060,610 | 126,169 | 95.59 | 26,893 | 3,315 | 176 | 332 | 165.894 | ..... | ..... | ..... | ..... | ..... |
| 1888 ..... | 11,069,784 | 166,809 | 66.36 | 29,883 | 3,055 | 174 | 897 | 182.625 | 93.41 | 92.36 | 94.57 | ..... | ..... |
| 1889 ..... | 11,378,962 | 175,000 | 65.02 | 34,056 | 3,288 | 222 | 1,347 | 212.832 | 94.25 | 94.82 | 94.92 | ..... | ..... |
| 1890 ..... | 14,434,722 | 185,000 | 78.02 | 36,192 | 2,191 | 229 | 1,479 | 229.257 | 92 83 | 93.55 | 93.58 | ..... | ..... |
| 1891 ..... | 17,007,275 | 188,904 | 90.03 | 38,250 | 2,111 | 230 | 1,544 | 237.967 | 93.33 | 93.66 | 93.91 | ..... | ..... |
| 1892 ..... | 18,246,371 | 188,904 | 96.59 | 39,401 | 1,200 | 288 | 1,535 | 242.561 | ..... | ..... | ..... | ..... | ..... |
| 1893 ..... | 18,208,278 | 188,904 | 96.38 | 39,927 | 526 | 300 | 1,600 | 244.964 | 94.18 | 94.18 | 94.18 | 96.37 | ..... |
| 1894 ..... | 18,056,881 | 188,904 | 95.58 | 40,326 | 399 | 258 | 1,580 | 245.478 | 94.88 | 94.88 | 94.88 | 95.24 | 95 21 |
| 1895 ..... | 18,192,063 | 190,000 | 95.74 | 40,683 | 357 | ..... | 1,500 | ..... | 94.88 | 94.88 | 94 88 | 95.05 | 95.05 |

## SCHEDULE No. 9.

COMPARATIVE STATEMENT OF COAL CONSUMED AND WATER PUMPED BY MONTHS FOR THE YEARS 1894 AND 1895.

| MONTH. | 1894. | | | | | | 1895. | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Engine No. | Water. | | Coal. | | | Engine No. | Water. | | Coal. | | |
| | | Quantity Pumped. | Total Pumped. | Quantity Consumed. | | Total. | | Quantity Pumped. | Total Pumped. | Quantity Consumed. | | Total Consumption. |
| | | Imp. Gals. Net. | Imp. Gals. Net. | Tons. Lbs. | | Tons. Lbs. | | Imp. Gals. Net. | Imp. Gals. Net. | Tons. Lbs. | | Tons. Lbs. |
| January | 1, 2 and 3 | 486,315,761 | | 1,267 | 1,630 | | 1, 2 and 3 | 195,238,922 | | 625 | 1,825 | |
| | 4 and 5 | 73,409,973 | | 109 | 1,660 | | 4 and 5 | 329,663,734 | | 418 | 315 | |
| | | | 559,725,734 | | | 1,377 1,280 | | | 524,902,656 | | | 1,044 140 |
| February | 1, 2 and 3 | 519,867,888 | | 1,238 | 1,840 | | 1, 2 and 3 | | | 99 | 1,500 | |
| | 4 and 5 | 36,778,009 | | 85 | 1,500 | | 4 and 5 | 540,834,116 | | 643 | 1,830 | |
| | | | 556,645,897 | | | 1,324 1,340 | | | 540,834,116 | | | 743 1,330 |
| March | 1, 2 and 3 | 274,628,203 | | 717 | 920 | | 1, 2 and 3 | 71,748,970 | | 300 | 1,700 | |
| | 4 and 5 | 291,158,731 | | 365 | 500 | | 4 and 5 | 523,091,981 | | 635 | 190 | |
| | | | 565,786,934 | | | 1,082 1,420 | | | 594,840,951 | | | 925 1,890 |
| April | 1, 2 and 3 | 245,961,309 | | 664 | 1,200 | | 1, 2 and 3 | | | 54 | .... | |
| | 4 and 5 | 285,726,680 | | 350 | 390 | | 4 and 5 | 525,606,249 | | 650 | 990 | |
| | | | 531,687,989 | | | 1,014 1,590 | | | 525,606,249 | | | 704 990 |
| May | 1, 2 and 3 | 377,936,401 | | 917 | 70 | | 1, 2 and 3 | 8,811,248 | | 127 | 220 | |
| | 4 and 5 | 227,912,611 | | 290 | 190 | | 4 and 5 | 538,780,495 | | 678 | 1,870 | |
| | | | 605,849,012 | | | 1,207 260 | | | 547,591,743 | | | 806 090 |
| June | 1, 2 and 3 | 286,670,925 | | 731 | 525 | | 1, 2 and 3 | 215,545,487 | | 610 | 380 | |
| | 4 and 5 | 277,093,573 | | 335 | 1,875 | | 4 and 5 | 416,149,640 | | 528 | 1,630 | |
| | | | 563,764,498 | | | 1,067 400 | | | 631,695,127 | | | 1,139 010 |
| July | 1, 2 and 3 | 275,829,412 | | 803 | 135 | | 1, 2 and 3 | 8,137,767 | | 85 | 089 | |
| | 4 and 5 | 305,433,336 | | 388 | 1,415 | | 4 and 5 | 583,499,275 | | 748 | 090 | |
| | | | 581,262,748 | | | 1,191 1,550 | | | 591,637,042 | | | 833 179 |
| August | 1, 2 and 3 | 244,403,896 | | 682 | 1,760 | | 1, 2 and 3 | | | 10 | 510 | |
| | 4 and 5 | 333,610,253 | | 479 | 530 | | 4 and 5 | 544,848,158 | | 713 | 1,810 | |
| | | | 578,014,149 | | | 1,162 290 | | | 544,848,158 | | | 724 320 |
| September | 1, 2 and 3 | 167,493,929 | | 525 | 1,270 | | 1, 2 and 3 | 26,596,517 | | 93 | 1,450 | |
| | 4 and 5 | 319,581,128 | | 442 | 1,330 | | 4 and 5 | 476,538,945 | | 661 | 910 | |
| | | | 487,075,057 | | | 968 600 | | | 503,135,462 | | | 755 360 |
| October | 1, 2 and 3 | 218,372,518 | | 722 | 1,635 | | 1, 2 and 3 | 199,765,943 | | 607 | 030 | |
| | 4 and 5 | 336,067,619 | | 419 | 470 | | 4 and 5 | 363,036,627 | | 516 | 1,490 | |
| | | | 554,440,137 | | | 1,142 105 | | | 562,802,570 | | | 1,123 1,520 |
| November | 1, 2 and 3 | 77,591,981 | | 328 | 1,330 | | 1, 2 and 3 | 178,424,364 | | 530 | 1,540 | |
| | 4 and 5 | 420,389,727 | | 504 | 1,220 | | 4 and 5 | 357,602,402 | | 494 | 680 | |
| | | | 497,981,711 | | | 833 550 | | | 536,026,766 | | | 1,025 220 |
| December | 1, 2 and 3 | 201,288,250 | | 656 | 1,725 | | 1, 2 and 3 | | | 6 | 000 | |
| | 4 and 5 | 305,970,026 | | 382 | 1,035 | | 4 and 5 | 535,759,378 | | 748 | 1,830 | |
| | | | 507,258,276 | | | 1,039 760 | | | 535,759,378 | | | 754 1,830 |
| Totals | | | 6,589,492,142 | | | 13,411 145 | | | 6,639,680,218 | | | 10,589 879 |
| Daily average | | | 18,053,403 | | | 36 1,485 | | | 18,190,902 | | | 29 024 |

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## SCHEDULE No. 10.

### Analyses of Expenditure at Main Pumping Station, 1895.

| | |
|---|---|
| Labor | $23,305 49 |
| Fuel and carting and screening same | 41,834 07 |
| Lubricants | 2,183 34 |
| Repairing furnaces | 626 52 |
| Repairs to engines and boilers | 962 80 |
| Repairing brick work | 257 40 |
| Rubber valves, repairs and rubber goods | 679 17 |
| Brass and bronze castings and Babbitt metal | 438 88 |
| Electric supplies | 977 35 |
| Plunger, liners to pumps, and plunger heads | 1,546 73 |
| Scale | 169 20 |
| General supplies and lumber | 2,339 63 |
| Rent of 'phones | 120 00 |
| Advertising, car tickets and cartage | 163 72 |
| Works Department, for labor and material | 164 66 |
| Total | $75,768 96 |
| *Cr.* | |
| Sundry amounts debited to other appropriations | 266 33 |
| Total | $75,502 63 |

## SCHEDULE No. 11.

MAINS LAID, TAKEN UP OR ABANDONED DURING 1895—ALSO SUMMARY OF MAINS NOW IN USE.

MAINS LAID DURING 1895.

| Street, Avenue, Etc. | Side of Street. | Location. | Feet. |
|---|---|---|---|
| 30-IN. MAIN: | | | |
| Front | North | From 30-in. main on John St. 60 ft. s.w., thence to a point 152 ft. west of John, thence south to 36-in. main | 218 |
| | | | 218 |
| 12-IN. MAIN: | | | |
| Bay | West | From Esplanade to Lake Street | 501 |
| Lake | North | From Bay to Lorne St., thence south to cut | 491½ |
| Leslie | | From 12-in. main N.W. cor. Eastern Ave. across street to sewer | 27 |
| | | | 1,019½ |
| 6-IN. MAIN: | | | |
| Avenue Lane | South | From University to Elizabeth Street | 556½ |
| Armoury | North | From University St. to Centre Ave. | 225 |
| Centre Rd | East | From North Drive south to hydrant | 168 |
| Elmslie Pl | East | From St. Joseph St. north to hydrant | 314 |
| King | North | From Peter to Bathurst Street | 2,780 |
| McMillan | West | From Carlton St. north to old main | 250 |
| North Drive | South | From Rosedale Road west to hydrant | 463½ |
| Springhurst Ave | West | Extension n. (from 173 ft. n. of old hydrant) | 111 |
| Tait | North | From Cherry St. east to old main | 163¾ |
| Tyndall Ave | West | Extension north from old hydrant | 110 |
| Waverley Ave | East | From Queen St. south to 2nd hydrant | 739 |
| West Market | | Across Esplanade and tracks to hydrant | 118 |
| Sugar Refinery | | In front of Refinery (blow out) | 128 |
| Foot of George | | From hydrant into crib (blow out) | 27 |
| Eastern Ave. E | North | Across Leslie Street | 50 |
| | | | 6,203¾ |

THE FOLLOWING MAINS HAVE BEEN ABANDONED DURING 1895.

| Street. | Side. | Location. | Feet. |
|---|---|---|---|
| OLD 6-INCH CEMENT MAIN: | | | |
| King | North | Peter to Bathurst Street | 2,768 |

THE FOLLOWING MAINS OF THE OLD FURNISS WORKS ARE STILL IN USE.

| Street, Avenue, etc. | Location. | Description. | Length in Feet. |
|---|---|---|---|
| Queen (east) | From Victoria to Jarvis Street | 8-in. iron | 1,325 |
| Queen (west) | " Yonge to Peter Street | " " | 3,785 |
| John | " Queen to King Street | 8-in. cement | 1,240 |
| Jarvis | " Queen to King Street | " iron | 1,190 |
| Gerrard | " Yonge to Jarvis Street | " " | 1,660 |
| Peter | " Front to Queen Street | " " | 2,000 |
| Adelaide (east) | " Yonge to Victoria Street | 6-in. iron | 340 |
| Berkeley | " King to Front Street | " " | 300 |
| King (west) | " Simcoe to Peter Street | " " | 1,690 |
| Queen (west) | " Peter to Bathurst Street | " cement | 2,800 |
| | *Total | | 16,335 |

* The iron mains on Berkeley, Adelaide and King Streets, amounting to 2,335 feet, are included in the general summary of 6-inch mains.

SUMMARY OF MAINS.

*Mains throughout the City of all sizes and descriptions, including those on Streets, Government, Private and other Property, at the end of 1895.*

| Size. | Length in Feet. |
|---|---|
| 36 inch Mains | 2,780 |
| 30 " " | 11,292 |
| 24 " " | 34,397 |
| 20 " " | 3,952 |
| 12 " Sub-Mains | 224,060¾ |
| 10 " " | 14,195 |
| 8 " " | 7,922 |
| 6 " " | 956,974¼ |
| 4 " " | 37,916 |
| 3 " " | 9,736½ |
| 2-in. and 1-in. small mains | 3,993 |
| Old iron and cement mains, 8 and 6 inches | 14,000 |
| Total in feet | 1,311,219½ |
| Total in miles | 248.336 |

## SCHEDULE No. 12.

HYDRANTS PLACED IN POSITION AND REMOVED OFF STREETS DURING 1895—ALSO NUMBER IN USE AT END OF 1895.

### HYDRANTS PLACED IN POSITION DURING 1895.

| STREET, AVENUE, ETC. | Side of Street. | LOCATION. |
|---|---|---|
| Avenue Lane | South | 127¾ feet west of Chestnut St. |
| Bay | West | 8 " north of Lake St. |
| " | " | 141 " " " |
| " | " | 282 " " " |
| Bell | North | 136 " east of River St. |
| Bloor | South | West line of Major St. |
| Centre Rd | East | 126 feet south of North Drive. |
| Colborne | South | 110 " east of Church St. |
| Crawford | West | N. E. cor. of King St. |
| Dundas | South | 74 feet west of St. Claren's Av. |
| Elizabeth | West | 14 " south of Elm St. |
| Elmslie Pl | East | 267 " north of St. Joseph St. |
| King (east) | North | 52¾ " west of apex of King and Queen Sts. |
| King (west) | " | 133 " " Peter St. |
| " " | " | 176 " " Spadina Av. |
| " " | " | 146 " " Charlotte St. |
| " " | " | 409 " " Spadina Av. |
| " " | " | North-east corner of Brant St. |
| " " | " | 157 feet west of Brant St. |
| " " | " | 221¼ " east of Portland St. |
| " " | " | 153½ " west of " |
| " " | " | 180 " east of Bathurst St. |
| Lake | " | 47 " west of Bay St. |
| " | " | 217¼ " " " |
| " | " | 412 " " " |
| McMurrich | West | 183¾ " south of Belmont St. |
| North Drive | South | 427 " west of Rosedale Rd. |
| Ontario | West | 190 " south of Duchess St. |
| Princess | " | 116 " " Front St. |
| Richmond | South | 74 " west of Jarvis St. |
| River | East | 17 " north of Queen St. E. |
| Springhurst | West | 680 " south of King St. |
| St. Mary | South | 284½ " west of North St. |
| Lorne | West | Between Front and Wellington Sts. |
| St. Nicholas | " | 12 feet north of Inkerman Terrace. |
| Temperance | North | 160 " west of Yonge St. |
| Simcoe | East | 200 " south of Front St. |
| Walter | South | 130 " east of Davenport Rd. |
| Waverley Av | East | 362 " south of Queen St. E. |
| " " | " | 676½ " " " " |
| Wilcox | South | 182 " west of Spadina Av. |
| Yonge | East | 300 " South of Front St. |
| " | West | North-west corner of Frichott St. |

SUMMARY OF HYDRANTS.

| | |
|---|---|
| Number of Hydrants set on streets at end of 1894 | 2,774 |
| " " " private and other property at end of 1894 | 66 |
| " " omitted in 1890 (on streets) | 48 |
| " " " " (private property) | 1 |
| | 2,889 |
| There were removed from off the streets during 1895 | 6 |
| | 2,883 |
| Number of Hydrants additional set on streets during 1895 | 43 |
| " " " " private or other property during 1895 | 0 |
| Total number of Hydrants in use at end of 1895 | 2,926 |

THE FOLLOWING OLD YORKVILLE AND FURNISS HYDRANTS HAVE BEEN TAKEN OUT AND REPLACED WITH PRESENT TYPE OF HYDRANTS.

| STREET, AVENUE, ETC. | Side of Street. | LOCATION. |
|---|---|---|
| Belmont | North | Opposite McMurrich St. |
| " | " | 350 feet west of McMurrich St. |
| Davenport Rd. | West | North-west corner of Ketchum Av. |
| " " | South | South-west corner of Yonge St. |
| Dean | East | North end of street. |
| Golding | North | 100 feet west of Markham St. |
| Maderia Pl. | " | East end of street. |
| Maitland Pl. | " | At end of street. |
| Rosedale Rd. | East | South-east corner of Avondale Av. |

THE FOLLOWING HYDRANTS HAVE BEEN REMOVED OFF THE STREETS DURING 1895.

| STREET, AVENUE, ETC. | Side of Street. | LOCATION. |
|---|---|---|
| King | North | 204 feet west of Spadina Av. |
| " | " | North-east corner of Brant St. |
| " | " | 313 feet west of Brant St. |
| " | " | 304 " " Portland St. |
| Simcoe | East | Opposite Union Station. |
| Yonge | " | Between Front and Esplanade Sts. |

## SCHEDULE No. 13.

List of all Valves Placed in Position and Taken Out During 1895, Showing the Size, Position, etc., also Total Number now in Use.

### Valves Fixed During 1895.

| Street, Avenue, etc. | Side of Street. | Location. |
|---|---|---|
| 30-inch. | | |
| Front | North | 10 feet west of John Street. |
| 12-inch. | | |
| Bay | West | South side of Esplanade (in line of telegraph poles). |
| Bloor | South | East line of St. Thomas Street. |
| Lake | South | East line of Lorne Street (on blow out). |
| Leslie | West | North line of Eastern Avenue. |
| " | West | " " " (on blow out). |
| Summerhill Ave | North | At entrance to Reservoir Park (on discharge pipe). |
| Yonge | West | South line of Davenport Road. |
| 6-inch. | | |
| Armoury | North | East line of University Street. |
| Avenue Lane | South | " " " |
| Bathurst | West | South line of McDonell Square (south). |
| Centre Ave | West | " " Avenue Lane. |
| Centre Rd | East | " " Crescent Road. |
| Chestnut | West | " " Avenue Lane. |
| Esplanade | North | East line of Church Street. |
| " | North | West line of W. Market St., on branch to hydrant. |
| " | South | On hydrant branch opp. Church St. (in line tel. poles) |
| " | South | " " " Yonge St. " " |
| " | South | 43 ft. 9 in. west of George St., on hydrant branch (in line of telegraph poles). |
| " | | Near hydrant foot George St. at water front (blow out) |
| " | South | On branch to hydrant at Sugar Refinery foot of Princess St. (in line of telegraph poles). |
| " | South | On blow out pipe 12 ft. e. cribwork in front Sug. Ref. |
| " | South | On branch to hydrant foot Jarvis (in line tel. poles). |
| Eastern Ave | North | East line of Leslie Street. |
| King | North | " " Spadina Avenue. |
| " | North | West line of Spadina Avenue. |
| " | North | East line of Brant Street. |
| " | North | " " Portland Street. |
| " | North | West " " " |
| Lake Shore Road | North | " " Sunnyside Avenue. |
| " " | North | Opposite old Parkdale Pumping Station. |
| " " | North | " " " " |
| New Parliament Bdgs | North | 9 ft. north of hydrant in quadrangle. |
| North Drive | South | West line of Rosedale Road. |
| Portland | East | South line of King Street. |
| Spadina Ave | West | North " " " |
| " | West | South " " " |
| St. Joseph | South | East line of St. Vincent Street. |
| Tate | North | " " Cherry Street. |
| Waverley Ave | East | South line of Queen Street. |

Valves Taken Out During 1895.

| Street, Avenue, etc. | Side of Street. | Location. |
|---|---|---|
| 6-INCH. | | |
| King ..... | North .... | East line of Brant Street. |
| 3-INCH. | | |
| College ..... | South .... | West line of McCaul Street. |

Summary of Valves on Streets, Etc., at End of 1895.

| Size. | In use at end of 1894. | Put in during 1895. | Taken out during 1895. | Total at the end of 1895. |
|---|---|---|---|---|
| Stop Valves. | | | | |
| 36 inch ..... | 4 | .... | .... | 4 |
| 30 " ..... | 7 | 1 | .... | 8 |
| 24 " ..... | 15 | .... | .... | 15 |
| 20 " ..... | 2 | .... | .... | 2 |
| 12 " ..... | 372 | 7 | .... | 379 |
| 10 " ..... | 7 | .... | .... | 7 |
| 9 " ..... | 11 | .... | .... | 11 |
| 8 " ..... | 11 | .... | .... | 11 |
| 6 " ..... | 1,542 | 32 | 1 | 1,573 |
| 4 " ..... | 49 | .... | .... | 49 |
| 3 " ..... | 24 | .... | 1 | 23 |
| * Totals..... | 2,044 | 40 | 2 | 2,082 |
| Check Valves. | | | | |
| 36 inch ..... | 5 | .... | .... | 5 |
| 30 " ..... | 4 | .... | .... | 4 |
| 24 " ..... | 1 | .... | .... | 1 |
| 20 " ..... | 1 | .... | .... | 1 |
| 12 " ..... | 12 | .... | .... | 12 |
| 6 " ..... | 43 | .... | .... | 43 |
| * Totals..... | 66 | .... | .... | 66 |

* These totals are corrected to end of 1895, an error having occurred in 1890.

## SCHEDULE No. 14.

STATEMENT OF HOUSE SERVICES LAID IN 1895.

| NAME OF STREET. | SIZE OF SERVICES. | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | ½-in. | ⅝-in. | ¾-in. | 1-in. | 2-in. | 4-in. | 6-in. | 8-in. |
| Abb | 1 | | | | | | | |
| Adelaide W | 2 | | | | | 1 | | |
| Agnes | 1 | | | | | | | |
| Alexander | | | | 1 | | | | |
| Amelia | 1 | | | | | | | |
| Armstrong | 1 | | | | | | | |
| Arthur | 1 | | | | | | | |
| Atlantic Ave. | | 1 | | | | | | |
| Avenue Street | | | | 1 | | | | |
| " Road | | | | 1 | | | | |
| Bathurst | | | | 1 | 1 | | | |
| Bay | 3 | | | | 1 | | | |
| Beachell | | | | | | 1 | | |
| Bedford Road | 1 | 1 | | | | | | |
| Bellevue Ave. | 2 | | | | | | | |
| Berkeley | 2 | | | | | | | |
| Beverley | 1 | | | | | | | |
| Birch Ave | 1 | | | | | | | |
| Bismarck Ave | 2 | | | | | | | |
| Blake | 2 | | | | | | | |
| Bloor W. | 1 | | 2 | | | | | |
| Bolton Ave | 2 | 1 | | | | | | |
| Bright | 2 | | | | | | | |
| Broadview Ave. | 1 | | | | | | | |
| Brooklyn Ave | 1 | | | | | | | |
| Brunswick Ave. | 1 | | | | | | | |
| Camden | 8 | | | | | | | |
| Cameron | 1 | | | | | | | |
| Carlaw Ave | 2 | | | | | | | |
| Carlton | 1 | | | | | | | |
| Carlyle | 1 | | | | | | | |
| Cawthra Square | 1 | | | | | | | |
| Centre Road | | | 1 | | | | | |
| " Ave. | 3 | | 1 | | | | | |
| Charles | | 1 | | | | | | |
| Chestnut | 3 | | | | | | | |
| Christopher | 1 | | | | | | | |
| Church | 1 | | | | | | | |
| Claremont | 1 | | | | | | | |
| Clinton | 3 | | | | | | | |
| Clyde | 2 | | | | | | | |
| College | 1 | | | | | | | |
| Collier | 1 | | | | | | | |
| Columbus | 1 | | | | | | | |
| Cottingham | 4 | | | | | | | |
| Crawford | 2 | | | | | | | |
| Cumberland | 2 | | | | | | | |
| Davenport Road | 4 | | | | | | | |
| Defoe | 1 | | | | | | | |
| DeGrassi | 1 | | | | | | | |

HOUSE SERVICES LAID IN 1895—*Continued.*

| NAME OF STREET. | SIZE OF SERVICE. | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | ½-in. | ⅝-in. | ¾-in. | 1-in. | 2-in. | 4-in. | 6-in. | 8-in. |
| Dovercourt Road | | 2 | | | | | | |
| Dowling Ave. | 2 | | | | | | | |
| Dufferin | | | | | 1 | | | |
| Duke | 1 | | | | | | | |
| Dunbar Road | | 2 | 1 | | | | | |
| Dundas | 3 | | 2 | | | | | |
| Dunn Ave | 3 | | | | | | | |
| Dupont | 1 | | | | | | | |
| Eastern Ave | 5 | | | | | | | |
| Elm Ave | | | 1 | | | | | |
| Elmslie Place | | | 2 | | | | | |
| Emerson Ave | 1 | | | 1 | | | | |
| Esplanade, E | 1 | 1 | | | | | | |
| " W | 1 | | | | | | | |
| Esther | 4 | | | | | | | |
| Euclid Ave | 2 | | | | | | | |
| Farley Ave | 1 | | | | | | | |
| Fern Ave | 1 | | | | | | | |
| Fisher | 1 | | | | | | | |
| Front, E | | | | | 1 | | | |
| " W | | 1 | 1 | | | 1 | | |
| George | 1 | | | | | | | |
| Gerrard, E | 2 | | | | | | | |
| Givens | 6 | | | | | | | |
| Glen Road | | 1 | | 2 | | | | |
| Guelph | 2 | | | | | | | |
| Hallam | 2 | | | | | | | |
| Harbord | 1 | | | | | | | |
| Harvard | 3 | | | | | | | |
| Hazelton Ave | 1 | | | | | | | |
| Henry | 1 | | | | | | | |
| Howland Ave | 2 | | | | | | | |
| Huron | 1 | | 2 | | | | | |
| Huntley | 1 | 1 | | | | | | |
| Jamieson Ave | 2 | | | | | | | |
| Jarvis | | | | 1 | 1 | | | |
| Kensington | 2 | | | | | | | |
| King, East | 1 | | | | | | | |
| " West | 5 | 1 | 1 | 1 | | | | 1 |
| Kippendavie Ave | 2 | | | | | | | |
| Lamport Ave | | 1 | | | | | | |
| Lansdowne Ave | 1 | | | | | | | |
| Langley Ave | 1 | | | | | | | |
| Larch | 1 | | | | | | | |
| Lee Ave | 1 | | | | | | | |
| Leopold | | 1 | | | | | | |
| Lippincott | 1 | | | | | | | |
| Logan Ave | 1 | | | | | | | |
| London | 1 | | | | | | | |
| McPherson Ave | 2 | | | | | | | |
| Macdonell Ave | 3 | | | | | | | |
| Madison Ave | | | 2 | | | | | |

HOUSE SERVICES LAID IN 1895—*Continued.*

| NAME OF STREET. | SIZE OF SERVICE. | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | ½ in. | ⅝-in. | ¾-in. | 1-in. | 2-in. | 4-in. | 6-in. | 8-in. |
| Manchester Ave | 1 | | | | | | | |
| Manning Ave | 5 | | | | | | | |
| Markham | 1 | | | | | | | |
| Marlborough Ave | 1 | | | | | | | |
| Maynard Ave | 2 | | | | | | | |
| Mill | 9 | | | | | | | |
| Munroe | 3 | | | | | | | |
| Mutual | 1 | | | | | | | |
| Nassau | 1 | | | | | | | |
| Nelson | 1 | | | | | | | |
| Niagara | 2 | | | | | | | |
| Norfolk | 2 | | | | | | | |
| North Drive | | | 1 | | | | | |
| Northumberland Ave | 1 | | | | | | | |
| Oak | 2 | | | | | | | |
| Observatory Road | | | | | | 1 | | |
| Ontario | 2 | | | 1 | | | | |
| Orde | | | | 1 | | | | |
| Palmerston | 1 | | | | | | | |
| Pape | 2 | | | | | | | |
| Parliament | 2 | | | | | 1 | | |
| Paul | 1 | | | | | | | |
| Pears Ave | 2 | | | | | | | |
| Pearson | 1 | | | | | | | |
| Peel Ave | 1 | | | | | | | |
| Perth Ave | 2 | | | | | | | |
| Phœbe | 1 | | | | | | | |
| Piper | 1 | | | | | | | |
| Price | 1 | | | | | | | |
| Prince Arthur Ave | | 1 | | 1 | | | | |
| Queen W | 2 | | | | | | | |
| " E | 1 | 1 | | 1 | 2 | | | |
| Rathnally Ave | 1 | | | | | | | |
| Richmond E. | | | 1 | | | | | |
| River | 3 | | | | | | | |
| Roncesvalles | 2 | | | | | | | |
| Rosedale Road | | 1 | | | | | | |
| Roxborough Ave | | 1 | | | | | | |
| Rusholme Road | 1 | | | | | | | |
| St. George | | | | 1 | | | | |
| St. Helen's Ave. | 1 | | | | | | | |
| St. Joseph | 2 | | | 1 | | | | |
| St. Mary's | 1 | | | | | | | |
| St. Nicholas | | 1 | | | | | | |
| St. Patrick | 1 | | | | | | | |
| St. Vincent | 2 | | | | | | | |
| Sackville | | | 1 | | | | | |
| Saulter | 2 | | | | | | | |
| Shaftesbury | 1 | | | | | | | |
| Shuter | 2 | | | | | | | |
| Sherbourne | 1 | | 1 | 1 | | | | |
| Simcoe | | | | | 1 | | | |

HOUSE SERVICES LAID IN 1895—*Continued.*

| NAME OF STREET. | SIZE OF SERVICE. | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | ½-in. | ⅝-in. | ¾-in. | 1-in. | 2-in. | 4-in. | 6-in. | 8-in. |
| Sorauren Ave | 1 | | | | | | | |
| Spadina Ave | | 1 | 1 | | 1 | | | |
| " Road | | | 1 | | | | | |
| Spencer | 1 | | | | | | | |
| Springhurst | 4 | | | | | | | |
| Strachan Ave | 1 | | | | | | | |
| Sullivan | 3 | | | | | | | |
| Summerhill Ave | 1 | | | | | | | |
| Symington Ave | 1 | | | | | | | |
| Tait | 1 | | | | | | | |
| Temperance | | | | | | 1 | | |
| Teraulay | | | 1 | | | | | |
| Turner | 1 | | | | | | | |
| Tyndall | 1 | | | | | | | |
| University | 2 | | | | | | | |
| Victor | 2 | | | | | | | |
| Victoria | 3 | | | | | | | |
| Vine | 1 | | | | | | | |
| Walker Ave | 1 | | | | | | | |
| Wallace Ave | 2 | | | | | | | |
| Walnut Ave | | | | | 1 | | | |
| Waverley Road | 7 | | | | | | | |
| Wellesley | 2 | | | | | | | |
| Wellington E, | | | | | | 1 | | |
| Wickson Ave | 1 | | | | | | | |
| William | | 1 | | | | | | |
| Wilson | 1 | | | | | | | |
| Wilton | | 3 | | | | | | |
| Winchester | 1 | | | | | | | |
| Wood | 1 | | | | | | | |
| Woodland Ave | | | 1 | | | | | |
| Woolsley | 7 | | | | | | | |
| Yonge | 4 | 1 | 1 | 1 | 1 | | | |
| Totals | 270 | 26 | 25 | 17 | 11 | 7 | | 1 |

## Meters Changed.

During the year the Machine and Meter Department have, in addition to the regular work of the Machine Shop proper, taken off for repairs and replaced meters as follows :

| Month. | ½-inch. | | ⅝-inch. | | ¾-inch. | | 1-inch. | | 1½-inch. | | 2-inch. | | 3-inch. | | 4-inch. | | 6-inch. | | 8-inch. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Off. | On. | Off. | On. | Off. | On. | Off. | On. | Off. | On. | Off. | On. | Off. | On. | Off. | On. | Off. | On. | Off. | On. |
| January | 2 | .... | 18 | 14 | 6 | 4 | 1 | 1 | .... | .... | 1 | 1 | .... | .. | 2 | 2 | .... | .... | .... | .... |
| February | ... | .... | 23 | 18 | 7 | 7 | 4 | 3 | .... | .... | 2 | 2 | 1 | 1 | 5 | 5 | .... | .... | .... | .... |
| March | 1 | ... | 19 | 17 | 9 | 7 | 3 | 3 | .... | ... | 2 | 2 | .... | .... | 4 | 4 | 1 | 1 | .... | .... |
| April | .... | .... | 20 | 17 | 4 | 5 | 5 | 5 | .... | .... | 2 | 2 | .... | .. | 4 | 1 | 1 | 1 | .... | .... |
| May | .... | 1 | 17 | 17 | 4 | 1 | 2 | 3 | .... | .... | 1 | 1 | 1 | .... | 1 | 2 | .... | .... | .... | 1 |
| June | .... | .... | 30 | 27 | 11 | 7 | 5 | 4 | .... | 1 | 1 | 1 | 2 | 2 | 1 | 1 | .... | .... | .... | .... |
| July | ... | .... | 22 | 20 | 9 | 9 | 3 | 4 | 1 | .... | 2 | 2 | .... | 1 | 1 | 1 | .. | .... | ... | 1 |
| August | .... | .... | 19 | 15 | 7 | 7 | .... | 1 | .... | .... | ..... | 1 | 1 | 1 | .... | .... | .... | .... | .... | .... |
| September | .... | .... | 33 | 23 | 12 | 6 | 2 | 1 | .... | .... | .... | .... | 1 | .... | .... | .... | ... | ... | .... | .... |
| October | .... | .... | 25 | 22 | 15 | 12 | 3 | 3 | .... | .... | .... | .. | 2 | 1 | 1 | 1 | .... | .. | .... | .... |
| November | .... | .... | 18 | 16 | 5 | 6 | 1 | ... | .... | .... | 1 | .... | 2 | 1 | 2 | 2 | .... | .... | 1 | 1 |
| December | .... | 2 | 10 | 7 | 3 | 5 | 3 | 5 | 1 | .... | 1 | .... | .... | .. | .... | .... | .... | .... | ... | .... |
| Totals | 3 | 3 | 254 | 213 | 92 | 76 | 32 | 33 | 2 | 1 | 13 | 12 | 10 | 7 | 21 | 19 | 2 | 2 | 1 | 3 |

METERS IN USE ON DECEMBER 31ST, 1895.

| | 10-inch. | 8-inch. | 6-inch. | 4-inch. | 3-inch. | 2-inch. | 1½-inch. | 1-inch. | ¾-inch. | ⅝-inch. | ½-inch. | ⅜-inch. | Total. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Worthington | .... | .... | .... | 2 | 40 | 83 | 12 | 135 | 61 | 28 | .... | .... | 361 |
| Kennedy | .... | .... | 12 | 8 | 12 | 4 | .... | .... | .... | .... | .... | .... | 36 |
| Crown | .... | .... | .... | 41 | 45 | 51 | .... | 70 | 223 | 543 | .... | 3 | 976 |
| Siemens & Adamson | 1 | 4 | 5 | 4 | 5 | 9 | .... | 32 | 28 | .... | 25 | .... | 113 |
| Hersey | .... | .... | .... | .... | ..... | 1 | .... | 1 | .... | 10 | .... | .... | 12 |
| Thompson | .... | .... | .... | .... | .... | .... | .... | .... | .... | 1 | .... | .... | 1 |
| Nash | .... | .... | .... | .... | .... | 1 | .... | .... | .... | .... | .... | .... | 1 |
| Totals | 1 | 4 | 17 | 55 | 102 | 149 | 12 | 238 | 312 | 582 | 25 | 3 | 1,500 |
| Hoists with indicators not metered | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | 100 |

TA
27
T7A2
1895
Toronto. Dept. of Public Works
Report of the city engineer

[redacted]
Physical &
Applied Sci.
Serials

Engineering

PLEASE DO NOT REMOVE
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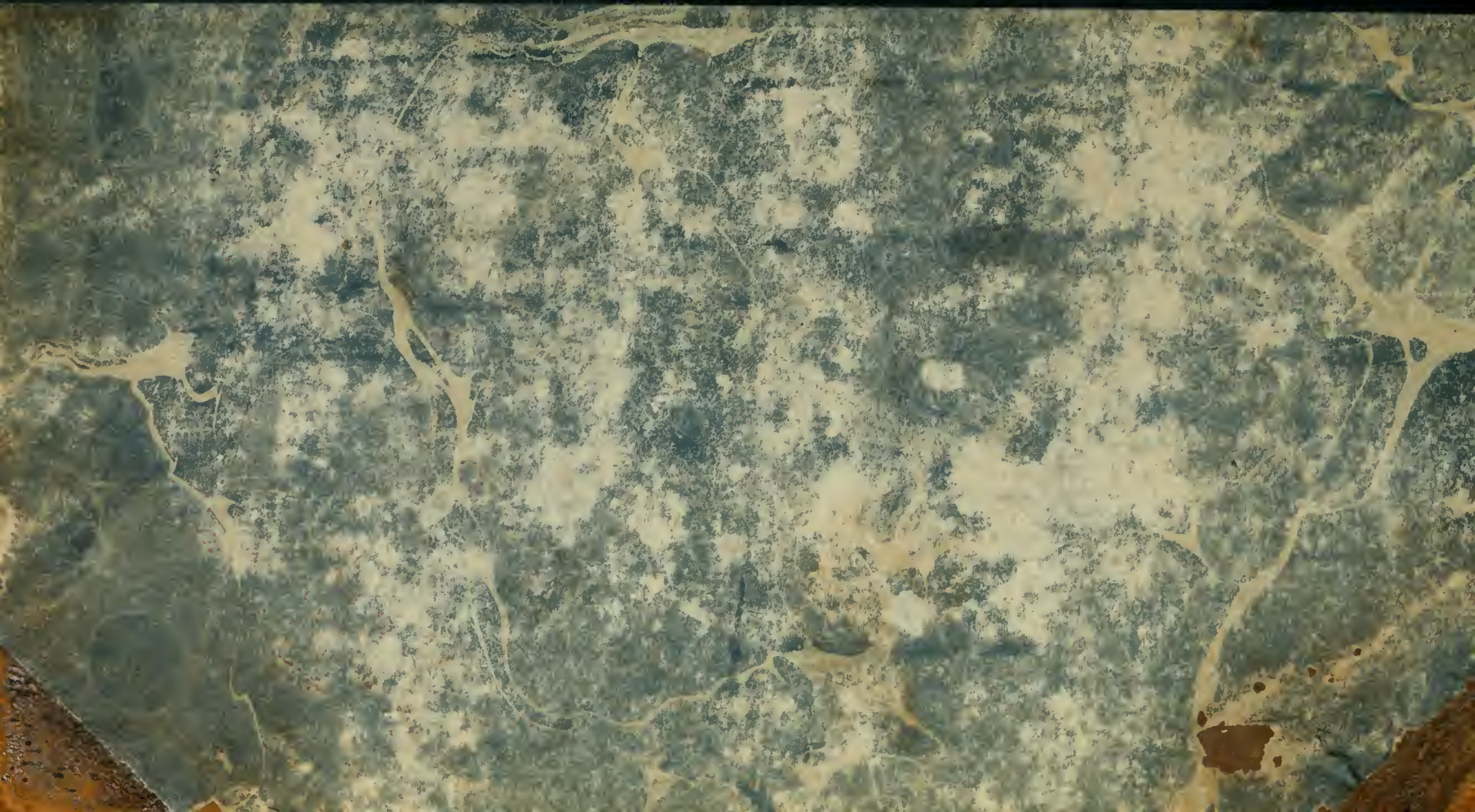
ENGIN STORAGE

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